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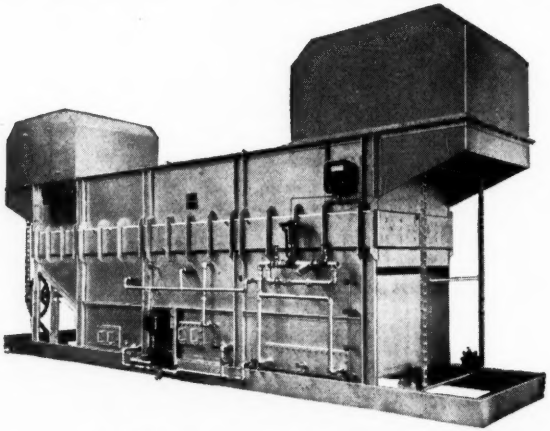

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Products Finishing

Cincinnati, Ohio Vol. 2, No. 4

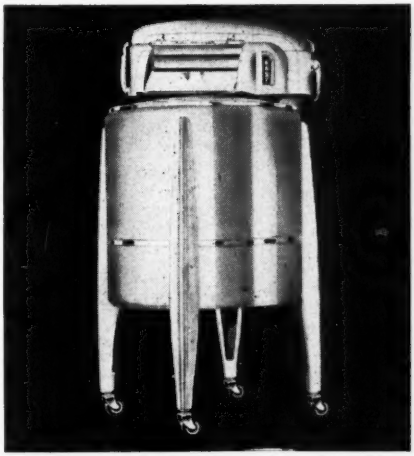
January, 1938

Super-Styling the Easy Washer

By G. B. Gilbert

Planning Engineer: Easy Washing Machine Corporation

THE family washing machine is primarily a utilitarian product; still, to insure that its utility will remain unimpaired for a reasonable length of service, a certain amount of finish must be applied to the metal surfaces. The Easy Washing Machine Corporation of Syracuse, New York, has gone further than this; all steel surfaces in Easy washers and ironers are now given double protection against rust and corrosion, in addition to which the factor of beauty is given utmost consideration through modern streamline styling. The outstanding features of the 1938 Easy washers are—in addition to mechanical efficiency—simplicity of structure, streamline design, smooth curves for attractive appearance and ease of cleaning, baked enamel finish and chrome beading.



Underneath the baked enamel finish the surface of the metal has been chemically rust-proofed by Bonderizing. Certain parts of the machine are also plated, thus providing a trimming which enhances the beauty of the product as a whole. The application of these beauty treatments makes imperative the use of equipment of the most modern type, and such is the equipment in use in the Easy Washing Machine Corporation's plant. Some of these operations and this equipment will be described in this article.

We will begin with the base skirt for the washer, which is stamped and

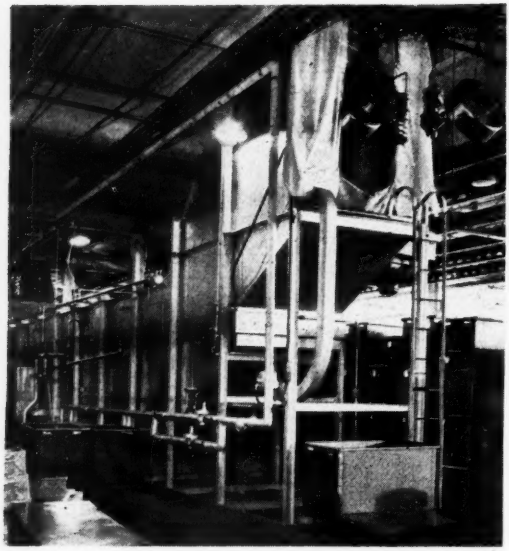


Fig. 1—As the base skirts for Easy washers leave the stamping department, they are conveyed through this Rex Permaclore Degreaser where all oil and other residue is removed.

rolled to shape from 0.050-in. sheet steel. The first finishing operation on the skirt is that of degreasing in a Rex Permaclore Degreaser. As the skirts leave the stamping department, they are hung on an automatic overhead conveyor which carries them through the degreaser at a speed of 17½ ft. per minute. This degreaser, shown in Fig. 1, is 67 ft. long, 17 ft. high and 7 ft. wide. The Permaclore is heated to 185 deg. F. and is then sprayed onto the work-pieces as they pass. Before leaving the degreaser, the work-pieces pass through a vapor of Permaclore. The efficiency of this degreasing equipment can be estimated from the fact that the previous cost for cleaning these pieces ran from 9 to 14 cents per square foot. The degreaser costs $4.25 per hour to operate, making a probable saving per square foot of 35 to 40 cents on the average. This saving is determined by the size, shape and the quality of the work-pieces.

As the work leaves the degreaser, it is carried into and through the Bonderizing tank, where the usual coating of phosphates is applied to prepare the surface of the steel for the finishing operations which follow. The Bonderizing tank, shown in Fig. 2, is 54 ft. long, which allows the parts to remain in process for a period of 2 minutes and 57 seconds, which is the length of time

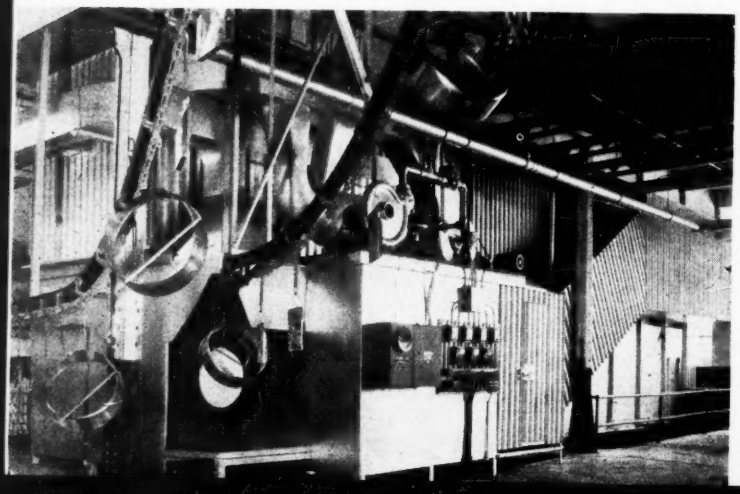


Fig. 2—Before any finishes are applied, the steel parts are Bonderized in this Bonderizing tank to prepare and rust-proof the surface of the steel.

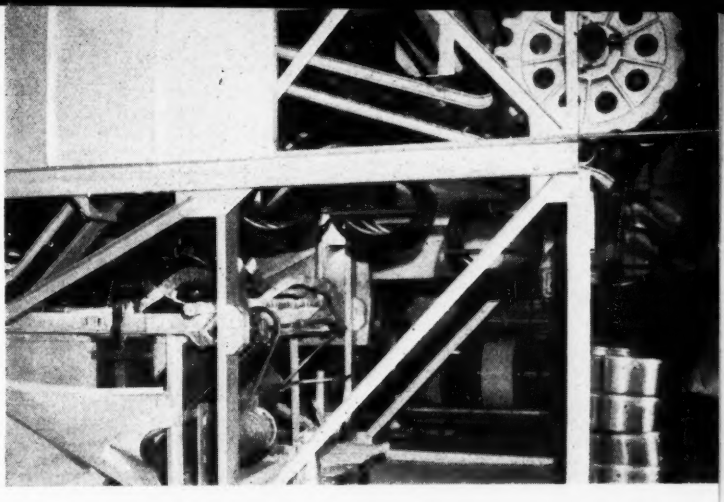


Fig. 3—The receiving end of the filler tank. Note the curved arms which, by means of an eccentric, are moved back and forth, carrying an agitator which keeps the solution stirred.

necessary for the Bonderizing process to be effective. This time is divided as follows: hot water, 34 seconds; Bonderite spray, 64 seconds; cold water, 39 seconds; chromic acid, 34 seconds, and oven, 6 seconds.

Upon emerging from the Bonderizing tank, the parts are removed from this conveyor and hung onto another one which carries them through a dip tank filled with primer, one end of which can be seen in Fig. 3. An interesting feature of this tank is the agitator, which consists of a paddle board extending across the tank and attached to the ends of the two arms by which the paddle is moved backward and forward to keep the solution properly stirred. The paddle is 4 in. high and is held in a vertical position, resting on the bottom of the tank. The arms are curved, as shown in the illustration, and each arm is connected to an eccentric crank arm on the end of a horizontal shaft which is driven by belt from a small motor under the tank.

As the pieces leave the primer tank, they are carried upward and through a drying oven which extends over a main aisle of the plant, the discharge end of which is shown in Fig. 4. This oven, which was built by the Young Bros. Company, is approximately 60 ft. long from end to end and the conveyor travels through the oven at a

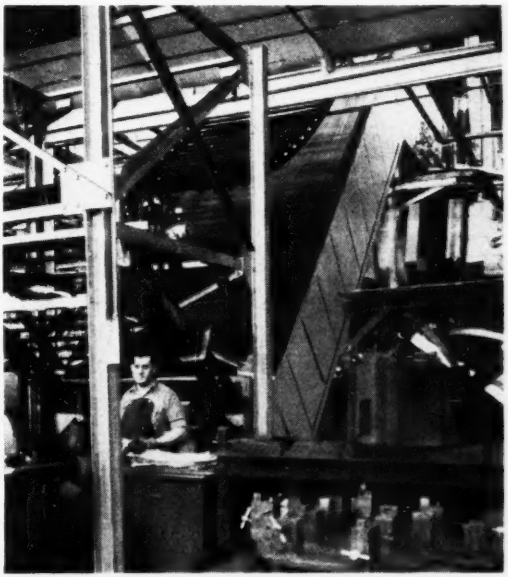


Fig. 4—The discharge end of the Mahon oven in which the parts are baked after the filler coat. This oven is 60 feet long and extends over the main aisle of the plant.

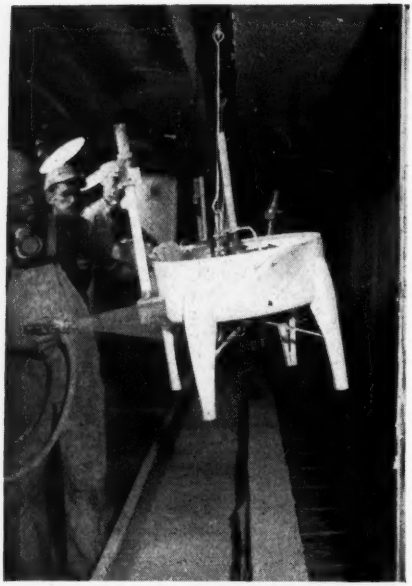


Fig. 5—Spraying washer and ironer parts. All excess spray is washed down by the water curtain in this Mahon Hydro-Filter Spray Booth so that it can be reclaimed. Note the individual spot lights between the working positions.

speed of approximately 2 ft. per minute, which is sufficient to allow the work-pieces to dry. The oven is built at a 45 deg. angle at each end; thus the baked pieces emerge from the oven at the floor level, where they are removed from the conveyor and inspected before going to the lacquer department.

All parts that are to be spray lacquered are hung on a conveyor which carries them through the Mahon down-draught, Hydro-Filter spray booths shown in Fig. 5. This conveyor moves at a speed of from 6 to 12 ft. per minute, which allows time

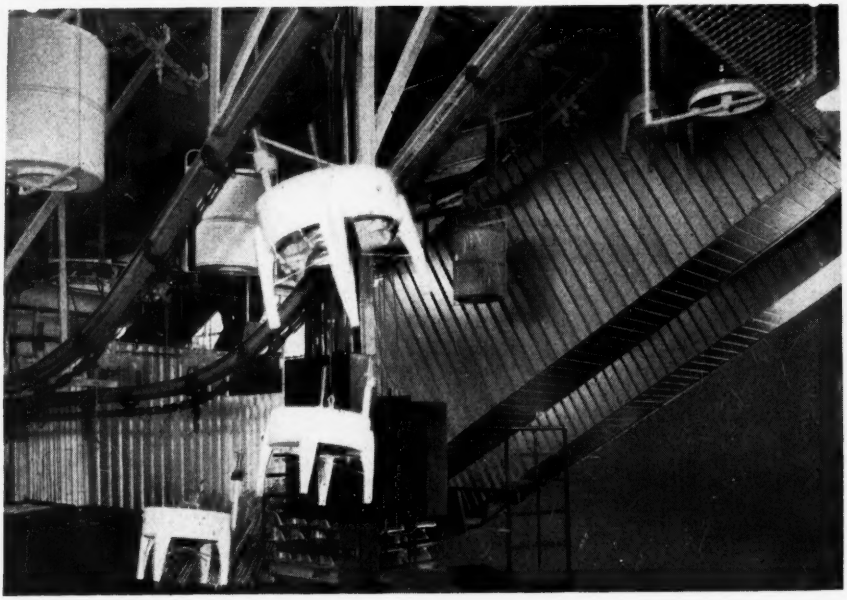


Fig. 6—After spraying, the parts are conveyed through this Mahon drying oven and thence to the assembly departments.

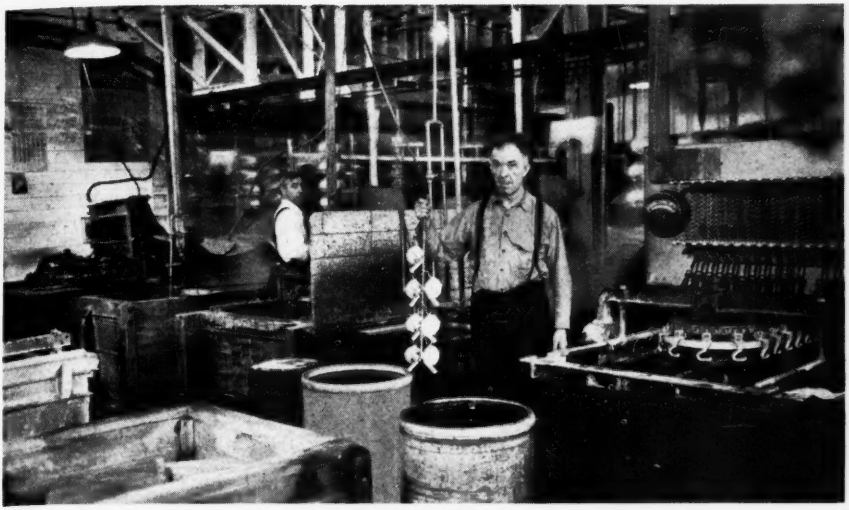


Fig. 7—A section of the plating department, showing three automatic plating tanks.

enough for each piece to be properly sprayed before it leaves the hands of the spray operators. Adequate lighting is provided by a battery of 100-watt spot lights arranged between the workmen's stations so that the light is directed upon the work. Binks spray guns of the most recent design are used, each spray gun drawing lacquer from its own container.

As the various parts leave the spray booths described in the preceding paragraphs, they are conveyed through a drying oven which is shown in Fig. 6. In order to clear several departments between the lacquering department and the assembly department, the oven is constructed so that it rises from the floor at an angle, thus utilizing a minimum of floor space and at the same time elevating the conveyor to a height which will enable it to clear the departments referred to.

As there are quite a number of parts on the washers and ironers which require plating, the plating department is unusually well laid out and equipped. The equipment includes a Hanson-Van Winkle-Munning plating barrel, a Richard Plating Barrel for cadmium plating small parts such as screws, washers and so on, to prevent corrosion and enable these parts to withstand wear, four Meaker automatic plating machines including one 15-ft. variable speed machine and three 23-ft. variable speed machines, and two Lasalco cadmium plating barrels.

All parts are carried into the plating department by automatic conveyors and go out the same way, thus eliminating the movement of trucks in and about the tanks. No trucks are allowed in the room. A station for racking and hooking up parts is provided outside the plating room door and the same parts are unhooked from the conveyors as they emerge from the department after processing. Among the parts that are plated are the vacuum basin, various types of handles and levers, pump body, drain board, agitator drive shaft, ironer shoe, tub outlet strainer, Spi-

ralator bearing, and many other parts. An idea of the production in this department can be determined from the fact that, in addition to other parts, the plating schedule at present calls for plating, per day, 1200 brass agitator position nuts, 1050 pump covers, 2000 retaining rings, 2000 pump inlet connections, and 1800 wringer position spline drive sleeves. Two anodizing tanks provide for anodizing the Spiralator and its cap, both of which are aluminum. This is necessary because, in use, the soap used in washing fabrics will discolor aluminum unless the parts have previously been anodized.

All of the equipment described in the preceding paragraphs has been planned and designed by chemical and mechanical engineers to the end that the individual household laundry equipment shall be interesting, attractive, and serviceable as well as efficient.

"Solvent Degreasing." This is the title of a 12-page folder which is now being issued by G. S. Blakeslee & Co., 19th St. & 52nd Ave., Cicero Station, Chicago, Illinois. The Blakeslee degreasing process and the various machines which can be used for vapor, vapor-spray-vapor, and immersion degreasing are described and illustrated. In the vapor machine, the vapor phase provides for the condensation of hot solvent on oily and dirty metal parts. The result is pure distilled solvent which instantaneously puts the oils into solution and drains off to the sump below. Condensation continues until the metal reaches the temperature of the hot vapors which is 180 deg. F.

In the vapor-spray-vapor machine, metal parts are immersed in the concentrated vapors. The condensate quickly starts to dissolve the oils. After a few seconds, the surfaces are flushed with clean, warm solvent applied through either fixed nozzles in the vapor column or a hand-guided spray pipe. After this flushing operation, the parts are allowed to remain in the vapors for further rinse and until the metal has reached the temperature of 188 deg. F. The spray helps to remove excessive dirt and scale.

In the immersion type machine the boiling solvent degreases instantaneously and penetrates closely packed stampings, screw machine parts, cracks, seams and removes caked buffing and polishing compounds. The liquid contact with the metal is said to give a very rapid heat transfer and shortens the degreasing time.

In many cases a short immersion in boiling liquid followed by a vapor rinse gives very good results.

This folder also describes Blakeslee automatic degreasers for heavy production. These automatic degreasers are equipped with solvent reclamation units, auxiliary stills, water separators, and water regulators.

Copy of "Solvent Degreasing" will be sent free upon request.

Leeds & Northrup Bulletin N-33. Of interest to executives, engineers, and operating men in a concise discussion of methods and instrument-types through which are realized the possibilities of modern temperature measurement and control which is designated as "Bulletin N-33" and is being issued by Leeds & Northrup Company, 4934 Stenton Ave., Philadelphia, Pennsylvania. Presented for the first time together are four distinct methods, all of which employ sound null-balance principles—one of which satisfies the conditions of practically any plant problem. Familiar to plant men are three of these—thermocouple pyrometers, resistance thermometers, and optical pyrometers. New to many are Rayotube pyrometers, which offer full reliability and low maintenance in certain applications within the range of 300 to 5000 deg. F. and where temperatures have heretofore been very difficult to record of control.

The complete line of Micromax and other L&N pyrometer instruments are illustrated and briefly described. To meet the needs of each plant problem, from the simplest to the most complicated, it is said to offer a wide choice of models from which suitable ones can be chosen to indicate, record, signal, control, or to perform these functions in any combination. Copy free upon request.

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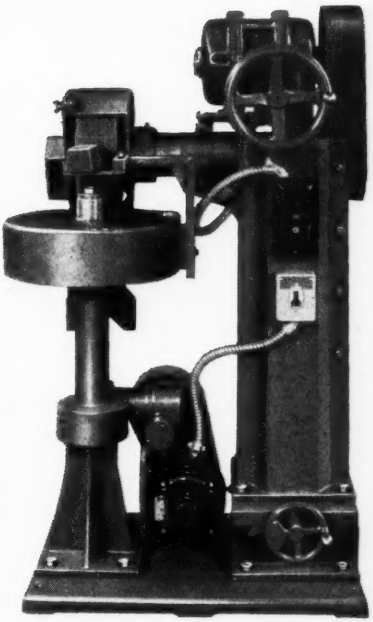

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The Application of Electroplating Practice to Porcelain Enameling

By Ezra A. Blount

Chemical Engineer, Chambers Corporation; Instructor in Electroplating, Ohio Mechanics Institute

FOR many years the dream of many enamelers — in addition to a white ground coat and an enamel fusing at a lower temperature — has been a method of increasing the speed of cleaning and pickling prior to the actual enameling process. While for years electroplaters have used electrolytic alkaline cleaning and in some cases electrolytic pickling to speed up this part of the process, this improvement has never been entirely successful when applied to the enameling industry.

More recently, solvent degreasing, vapor degreasing, emulsion degreasing and various forms of mechanical washing have been used in the plating plant. These late advances in the science of cleaning metal are applicable to the porcelain enamel plant either in combination with electrolytic cleaning and pickling or separate from it. It is the purpose of this article to show how a combination of cleaning and pickling methods now in use in electroplating plants can be applied to a porcelain enamel plant in which sheet iron or steel is cleaned, pickled, and enameled.

Resume' of Current Enameling Practice

In the majority of porcelain enamel shops the ware to be cleaned and pickled is placed in large Monel metal baskets or frames and transferred from tank to tank by means of an electric hoist and overhead rail. The process may be separated into four distinct parts; namely cleaning, pickling, neutralizing, and drying. The basket of ware is first placed in the cleaning solution which is operated boiling and contains from 4 to 7 ounces per gallon of some commercial alkaline cleaner, the exact concentration depending upon the type of cleaner used. For control purposes, the cleaner is kept at a concentration equivalent to 4.5 per cent sodium hydroxide.

After the grease and drawing compound have been removed, the work is run through a water rinse and placed in the pickling bath. This is a 4 to 6 per cent solution of sulphuric acid operated at 160 degrees Fahrenheit. After the ware has been pickled so that all rust and welding scale has been removed and the surface has been etched, it is run through another water rinse and placed in the neutralizing bath. This solution is usually made by dissolving .3 ounce per gallon of borax and .6 ounce per gallon of soda ash in water. The neutralizer is operated at 160 degrees Fahrenheit and has the function of forming a neutral film on the surface of the pickled iron. For control pur-

poses, the neutralizer is maintained at a concentration equivalent to .3 per cent sodium oxide. After the ware has been neutralized, it is placed directly in some sort of a dryer. When dry it is ready to be enameled.

There are two distinct disadvantages to this process which are somewhat dependent on each other. When the ware is packed in the baskets, it is packed so tightly (nested) that proper circulation of the various solutions through the baskets and around the work is impossible. Hence the time required in each solution is increased and a uniform cleaning and etching is very difficult to obtain. The time required to clean and pickle by this process is in itself an objectionable feature. Normally the work is left in the alkaline cleaner 30 minutes, in the sulphuric acid from 10 to 20 minutes, and in the neutralizer from 1 to 5 minutes. The neutralizer, like the water rinses and the dryer, is not the "bottle neck" of the process.

The Application of Emulsion Degreasing to "Basket" Cleaning Prior to Porcelain Enameling.

The removal of oil, grease, or drawing compound can be accomplished very rapidly in a solvent or vapor degreaser. This, however, does not clean the work perfectly and leaves a film of smut — part of which is the pigment in the drawing compound — on the ware even if the degreasing is followed by a short dip in an alkaline cleaner. Another degreasing process which has found great success in electroplating is "emulsion degreasing." In this process, the work is immersed for 1 to 2 minutes in an emulsion degreasing solution, rinsed in water, and immersed in an alkaline cleaner for 3 to 6 minutes. This method dissolves the grease and loosens all smut or pigment so that it is either rinsed off or cleaned off in the alkaline cleaner. To correspond with this reduction in cleaning time, the pickling time can be reduced to 6-10 minutes by the use of a "wetting agent" in the pickling solution. This reagent enables the acid to "wet" the surface of the metal more perfectly and thus attack the surface more completely and uniformly. These two improvements may be worked into the cleaning and pickling process and the steps in the new process synchronized as follows:

1. Dip basket of ware in emulsion degreasing liquid and permit to drain. (Usual time for drain after dip is 6 minutes).
2. Rinse basket of ware in warm, flowing water.
3. Clean ware in boiling alkaline cleaner 3 to 6 minutes.
4. Rinse in hot water.
5. Pickle ware 6 to 10 minutes in 6 per cent sulphuric acid operated at 160 degrees Fahrenheit. Time longer than 6 minutes is necessary only when the iron sulphate builds up to 5 or 6 per cent. The acid should be discarded shortly after the iron sulphate content reaches 6 or 7 per cent.
6. Hot water rinse.
7. Neutralize in soda-borax neutralizer 5 minutes.
8. Dry and deliver to ground coat dip tank.

This system can be used on ware of any shape; any ware that can be loaded into pickling baskets can be cleaned and pickled by this process.

The major advantage of this process lies in the reduction of cleaning and pickling time. The cleaner cost is reduced, since the major portion of the cleaning is done in the emulsion degreaser. This saving is offset somewhat by the cost of the emulsion degreaser. Although an emulsion tank and rinse tank must be

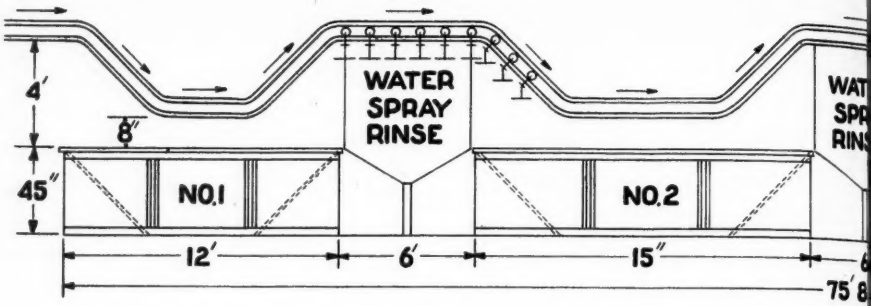


Fig. 1—Diagram showing a unit in which workpieces can be cleaned, pickled, neutralized, dried, a conveyor is used and the workpieces are hung by auxiliar

added to the normal pickling set-up, this expense is compensated by the elimination of one cleaner tank. Most plants have two cleaner tanks for every acid tank since the cleaning time is normally twice the pickling time.

In a recent production test, 99 pieces of flat ware were cleaned and pickled by the process described above and enameled in two cover coats of white porcelain enamel. Of the 99 not one was rejected by the final inspector for a defect that might possibly be attributed to faulty cleaning and pickling.

The Application of Emulsion Degreasing to an Electrolytic Cleaning and Pickling Process.

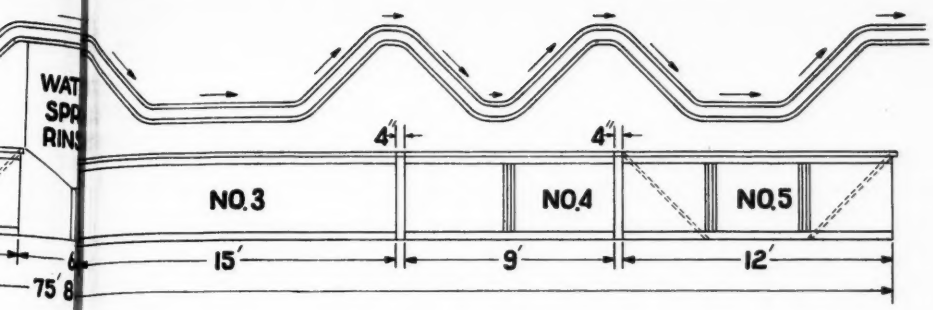
Review of Previous Investigations.

An early comment on electrolytic cleaning for enameling was made by Lindemann (1) who reported that ware could be cleaned electrolytically in from 1 to 2 minutes with a current density of 4 amperes per square foot flowing through the alkaline cleaning bath. He states further in part... "The success of the electric method of cleaning has suggested the application of electricity to pickling. Experiments have shown that the ware so handled is put into better condition for enameling, but the process entails extra cost beyond gain in the condition of the metal." Later Dr. A. E. Chester, J. T. Irwin, and Clayton Ellinger (2) performed very extensive experiments on electrolytic cleaning and pickling of sheet iron for porcelain enameling. The process developed by them involved the use of alternating current superimposed upon direct current in both the alkaline cleaning bath and the acid pickling bath.

In the cleaning bath, the current was made to flow through the basket of work, but in the pickling bath the current merely flowed through the solution, the charging effect of the current and the alternating polarity producing a more uniform etch in reduced time. A detailed discussion and description of this same process is given by J. T. Irwin in a more recent article. Despite the vast amount of research performed on this particular process, apparently it has not been developed to the point of commercial importance. However, it is a step in the right direction.

An Ideal for The Pickling Room

An ideal condition in the pickle room would be, obviously, to have the process so synchronized that ware could be immersed for the same length of time in each solution and



dried, and passed to the point where they are dipped into the ground coat. One continuous monel hooks onto the master hooks of this conveyor.

that the time of immersion in each solution be reduced to the time necessary to neutralize; namely, 1 to 2, or at most 5 minutes. Thus the ware would flow smoothly through the pickle room whether the "basket" process was employed or whether the work was cleaned and pickled automatically on a chain conveyor.

The work of Chester, Irwin, and Ellinger (2) led to the development of a method for reducing the cleaning and pickling time required in the "basket" cleaning and pickling process. Their method cut the cleaning and pickling time in half, but it had certain practical disadvantages that made its widespread application undesirable. The whole process was still not synchronized even though a tremendous improvement had been made. The problem to be solved is to improve the speed of cleaning and pickling without detracting from the quality of the enamel coating or the bond between the enamel coating and the sheet metal.

Some Experimental Steps Toward the Ideal

The first major improvement concerns the cleaning process. The experiments on emulsion degreasing were continued in combination with electrolytic alkaline cleaning. Experiments on this type of cleaning have shown that a half-minute soak in the solvent, a water rinse, and a half-minute in an electrocleaner employing a current density of 5 amperes per square foot will produce a surface clean enough to be pickled and subsequently enameled. Of course, this sytem will not apply to a "basket" process since the current distribution over the piece must be fairly uniform. If the time is increased to 1 and ½ minutes or 2 minutes in both solvent and cleaner, the pieces may be hung back-to-back with good results.

Preliminary experiments on electropickling proved that welding scale could be removed from sheet metal by making it the cathode in an 8 to 10 per cent solution of sulphuric acid and employing a current density of 5 to 10 amperes per square foot. (Time required in some cases was only 15 seconds). To insure a more uniform surface, the pickling time was increased to 1½ minutes and the pieces so pickled were enameled with uniformly good results. As in "soak" pickling the temperature of the acid solution was kept at 160 degrees F. Unlike the other work on electropickling in which the work was either made the anode or not connected to the source of current, the metal to be

pickled in this case was connected to the source of current and made the cathode. Of course, the mechanical cleaning action of the evolved hydrogen gas was responsible in part for the rapid scale removal.

Another interesting part of these experiments was the determination of the effect of iron in the acid on the electropickling time. A contamination of iron sulphate up to 20 per cent increased the time of scale removal to only 2 minutes, whereas in the "soak" type of basket pickling the acid is discarded when the iron sulphate content reaches 5 or 6 per cent. Although the degree of etch produced by 1½ minutes of electropickling was not as great as that produced in 15 minutes of "soak" pickling, still the bond between the enamel and the metal was essentially the same in each case.

Application of Experimental Results to Plant Practice

Since the success of the electrocleaning and electropickling process depends on the action of the electric current, the ware to be enameled must be suspended in the various tanks so that the current may have access to most of the surface to be enameled. Hence the "batch" process cannot be used, and in its place must be substituted a continuous chain conveyor on which the work can be hung. Thus the work can be cleaned, pickled, neutralized, dried, and carried to the ground coat dipping tanks on one continuous conveyor. A typical pickle room layout for this process is shown in Figure 1. The work is hung by auxiliary monel hooks on the master hooks fastened to the chain conveyor. The size and shape of the master hooks and the space between each, depends upon the size of the ware being pickled.

The ware passes first through Tank No. 1, the solvent tank. The speed of the chain and the size of the tank are so designed that the ware remains in contact with the emulsion degreaser for 1 minute. Passing out of the solvent, the ware passes through an overhead cold water spray rinse and into the cleaner tank, No. 2. It remains in contact with the alkali cleaning solution 1½ minutes. The electrocleaning solution is operated at 200 to 210 degrees F. and contains sufficient cleaner to produce an equivalent alkalinity of 2 to 3 oz. per gallon of sodium hydroxide. The ware passes next through another overhead water rinse into the acid tank, No. 3, where the pickling takes place. The ware is electropickled cathodically 1½ minutes at a temperature of 160 degrees F. and an acid concentration of 6 to 8 per cent sulphuric acid. The ware then passes through a warm water rinse tank, No. 4, and through the neutralizer tank No. 5. The ware is in contact with the neutralizer solution 1 minute. The neutralizer is operated at 160 degrees F. and has the same composition as the typical soda ash-borax neutralizer described above. The ware passes through a dryer after leaving the neutralizer tank and is then ready to be dipped in ground coat enamel. A summary of the various tanks and their contents follows:

TANK	CONTENTS	CONSTRUCTION
Solvent No. 1	Emulsion degreaser	10 Ga. welded steel
Cleaner No. 2	Alkaline cleaner	10 Ga. welded steel
Acid No. 3	Sulphuric acid	Wood, lead lined
Rinse No. 4	Warm water	10 Ga. welded steel
Neutralizer No. 5	Soda-borax mixture	10 Ga. welded steel

(As shown on the plant layout Fig. 1, the capacities of these tanks—ex-

cluding the acid tank—can be reduced by making their narrow sides on a 45 degree angle.)

The electric current is conducted into the electrolytic cleaner by making the tank the anode. Graphite anodes are required to conduct the current into the acid tank. In both cases, the current is taken from the tank or solution by means of a bus bar mounted above the tank. The master hooks are insulated from the conveyor tank and are fitted with spring contacts which engage the bus bars and thus connect the ware with the source of current. For this particular example, the generator capacity required is 3,000 amperes at 5 volts.

Economic Aspects of the Process

The principle saving effected by the process is that of time. The system shown in Figure 1, at a chain speed of 5 per minute, will produce the same number of units in 8 hours as a "batch" process of similar size will produce in 16 hours. In addition, all manual labor in the pickle room is confined to the men loading the conveyor, and all intermediate trucking is eliminated. Only half as much alkali cleaner will be used in the conveyorized system since most of the grease is removed in the emulsion degreaser. The acid can be used 2 to 3 times as long before it must be discarded due to an excessive iron content. However, these savings over the conventional process will be offset by the cost of the emulsion degreaser, the cost of the electric current, and the cost of the mechanical and electrical equipment necessary for the process.

Discussion of Some Objections to the Process

As stated, one objection to the use of this process is that it involves a

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very substantial original investment. However, in view of the fact that it will do the work of two "batch" pickle rooms of similar size, it should merit consideration.

The process is especially adapted to the handling of flat ware, since special shapes are difficult to hang on a chain properly. However, special racks can be made to hold any type of ware providing the electric current can still be distributed over the surface of the ware.

The most serious objection to the use of this system is the difficulty of conducting the electric current through the system without tremendous stray current loss. This problem has been solved very satisfactorily by the manufacturers of automatic electroplating machinery and there is no reason that their methods should not apply in this case. Master hooks can be insulated so that no current will flow from the hooks to the chain conveyor. These master hooks can then be provided with spring contacts that will engage the heavy bus bars mounted above the alkaline cleaner and the acid tanks. Thus current will flow through the solutions and the ware and out through the master hooks, all the while being insulated from the chain and track of the conveyor. Of course, the cleaner and acid tanks can be insulated from the ground in the usual manner, and insulating couplings placed in all steam and water lines for those tanks.

Even if the automatic conveyorized process may seem too involved and complicated for most plants, the application of the emulsion degreasing principle to speed up "basket" process cleaning should merit consideration.

References

(1) The Electrolytic Cleaning of Metals for Enameling Purposes, by W. C. Lindemann. J. Am. Cer. Soc. 3-252 (1920).

(2) Electric Cleaning and Pickling of Sheet Iron Prior to Enameling, by Dr. A. E. Chester, J. T. Irwin, and Clayton Ellinger, **Enamelist**, May, 1936.

Amercoat On Guard Against Corrosion. A corrosion-proof, sprayable coating for steel, known as "Amercoat," is described in an 8-page catalog which is now being issued by American Concrete Steel Pipe Co., P. O. Box 1428, Arcade Station, Los Angeles, California. This coating is said to be a non-conductor of electrical current and will stand the ravages of electrolysis. It has been compounded to work most efficiently within a temperature range from minus 50 deg. to 150 deg. F. It is impervious to gas attack and may be employed as a seal against gas or air leakage at moderate temperatures.

Amercoat is a compound of chemically inert plastics and solvents and in order to give it body, certain solid inert substances, such as finely divided silica, are added when required. To build up an Amercoat protective coating a thin coating of prime or bonding solution is applied, then the desired thickness of Amercoat Enamel, containing the body or solid substances, is sprayed over the prime coat. When this is dry, the entire covering is sealed with a thin application of a final or seal coat. Copy free upon request.

Hancock Flocontrol Valves Bulletin 7500-C. The Hancock Valve Division of Manning, Maxwell & Moore, Inc., Bridgeport, Conn., is now offering an 8-page bulletin describing the new Hancock Flocontrol Valve. This valve is said to provide accurate manual control of steam, liquids, and gases. The Hancock Flocontrol Valve is a combination valve and flow control instrument. It is equipped with a special micrometer dial and pointer which enable the operator to set the valve opening to within one-hundredth of a turn of the handwheel. Included in this bulletin are charts describing the relative capacity of Hancock Flocontrol Valves. A few of the many applications where this type of valve is applicable are listed. Copy free upon request.

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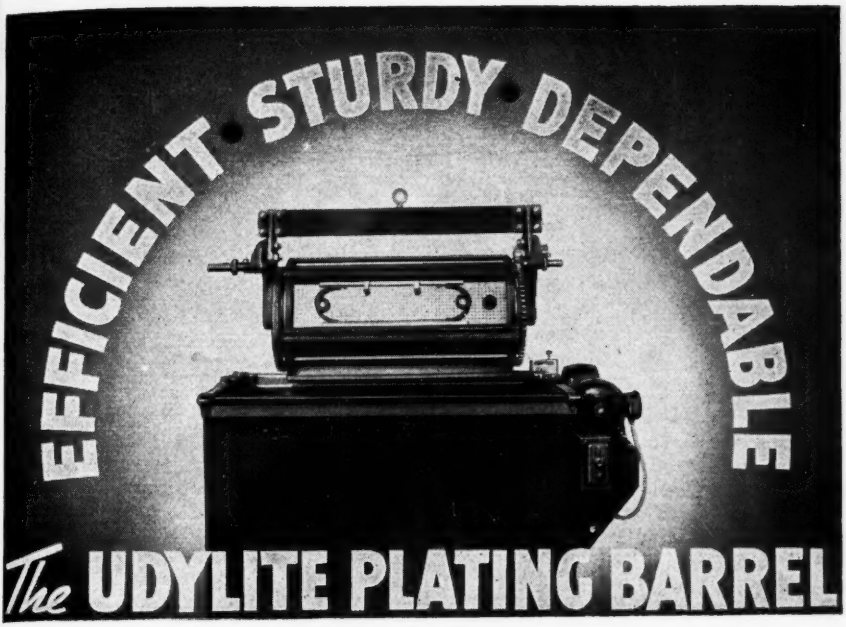

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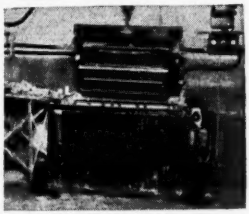

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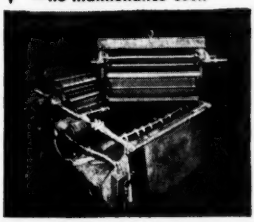

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Barrel Finishing of Metal Products

Twelfth Article of Series—Factors in Specifying Rolled Strip Steel for Stamping and Forming

By H. Leroy Beaver

IN several of the preceding papers in the current series on barrel finishing we have commented on the subject of specifications for rolled strip steel, viewing the subject from various angles as seemed most pertinent to the particular operation then under discussion.

In the August, 1937 issue of Products Finishing, we commented on various factors effecting rolled strip steel and the importance of having a proper type and finish of material in order that succeeding stamping and forming would be conducive to the best possible final finishes. To those readers who recall the various references on these phases, a review of papers and more particularly the August issue will not be necessary, but to those other readers, we would refer them to the preceding papers to avoid the necessity for repetition of already stated material in the series.

At any rate, the previous comment on the subject has given rise to many inquiries, the gist of them all being resolved into requests for specifications covering what experience would suggest as a general specification contemplating a type of rolled strip steel material that would be considered as an ideal product for forming into stampings of various kinds and which while being the most satisfactory for eliminating forming procedure difficulties would, at the same time, lend itself to the securing of the most satisfactory finishes, whether by barrel burnishing, buffing or any of the operations in the general finishing cycle up to and including the final market finish.

Of the ever present problem of low cost and fine plated or other finishes on rolled strip steel parts, the whole difficulty as most often met with resolves itself into two definite problems—first, and principally a lack of knowledge of just what is required and consequently an inability to specify a proper material to remedy the difficulty, and secondly, an equally important difficulty that starts with unnecessarily intricate design of parts details which almost automatically leads to impossible, improper or inadequate press shop methods.

Through intensive pressure brought to bear on manufacturers of rolled strip steel, it is possible today to carry out procedures that would have been utterly impossible even three or four years ago. Such marked progress toward higher quality has been made by rolling mills generally, that one may now consistently procure rolled strip steel under such a specification that no wheel finishing whatever is required, and these improved steels are of such a character that only a light barrel burnishing operation is required to fit them for plating. This is true even though considerable working is necessary in the produc-

tion of the part prior to the final finishing. There is no reason why manufacturers as well as platers generally should not know of these improved rolled strip steels and to fully understand how to order them so that they might utilize to the full the advantage of the savings of both time and money by their use, and to realize as well the finer finish and appearance of the product when placed on the market.

Even if you are required to purchase your rolled strip steel on a price per pound basis, and even though these better steels are more costly, we believe the specifications we have to give to you, provided you have an open mind on the subject, will be both interesting and profitable to you, provided you adopt them. At least in fairness to your product, a small trial order should be purchased so that you may judge for yourself the possibilities to be realized.

To come down to a concrete case let us consider a common round flanged lid of .037 rolled strip steel stock, weighing when finished, one pound. Now if cheap cold rolled stock is used for this piece the cost of the material will probably be in the neighborhood of 3½ to 4 cents, and press operations or a combination of blanking and forming operations followed by trimming and punching would approximate six dollars per thousand pieces or 6/10 of one cent each. Now with cheap cold rolled stock you will almost invariably find a necessity to wheel polish all over the piece at a cost of not less than 3 cents, based on the polisher earning $1.00 per hour. In nickle plating, such as a piece due to imperfections on the surface you would require at least a full .001 in. of nickle in order that the buffer may have sufficient material that he can buff to a satisfactory finish without cutting through and exposing polishing wheel scratches. This buffing will cost approximately 1½ cents on each piece based on the same hourly rate of $1.00 as paid to the polisher.

Adding all of the above items, we find that we have a total labor and material cost of:

Material	.035
Press Operation	.006
Polishing	.030
Buffing	.015
Total	.086

Now, instead of purchasing stock costing from 3 to 4 cents per pound, let us plan to buy the best rolled strip stock obtainable, and to buy this to a definite specification, properly boxed, papered and inspected, which will cost about 6¼ cents per pound.

With this better class of material, instead of rushing it through the press room, let us handle the details of the operations a little more carefully, and may we here again refer the reader to our remarks on handling this type of material as contained in the paper in the August, 1937 issue of Products Finishing. Spend a little more time on your dies and their contouring and set-up, and as far as possible keep out die marks, slugs, handling scratches, and then pay 8/10 cents per piece instead of 6/10 cents as paid on the cheaper material.

By following this procedure, you will find it altogether feasible and possible to entirely eliminate the polishing operation and at the same time reduce the cost of buffing from .015 cents to .01 cents while at the same time being required to deposit only .00075 of nickle thickness since the extra .00025 plated on the cheaper stock was only lost in an effort to cover up marks left by the polishing wheels, so that we now find the following:

Material	.0625
Polishing	none

Press Operation	.0080
Buffing	.0100
Total	.0805

and this figure does not include the saving on nickle as metal and its plating time. Also in order to simplify the problem all overhead has been omitted which when figured would show an appreciable greater saving.

Let it be understood by the reader that the above figures do not in any sense represent a theoretical case, but are actual production cost figures taken from the records of one of our foremost manufacturing plants who produce a nationally known line of products, and they are applicable to the production costs on hundreds of thousands of pieces.

Understading then that we are dealing with actual workable practice and not with theory, may we continue to, and ask you to most carefully consider the following specifications covering rolled steel strip, contained in six numbered sections, each of which directly relates to the others and when taken in their entirety comprise a general specification that we can safely say will immeasurably improve, if dilligently adhered to, the appearance and quality of products generally as formed from this better type of material.

1. Finish

This should be specified as No. 3 cold rolled strip steel of proper gauge, width and in multiples of the length required to make one piece. The No. 3 means to the mill a finish free from handling marks, scratches, rolled shear edges, dents, dirt and anything which would require polishing to remove a blemish of any kind, and most important of all, a certain degree of brightness given by the last cold pass which is better for plating than anything short of buffing with stainless steel compound. The multiples of the length of one piece although an extra, will more than pay for itself in scrap savings and obviate the necessity for rehandling to shear.

2. Oiling

This specifies the use of an oil or grease preferably of lanolin base or any other 100 percent saponifiable composition which will not dry out or shrink during storage. If the proper type is used, no further lubrication will be required for the usual blanking, forming, punching and bending press operations.

3. Papering

Each sheet must be separated by a special type of sulphate paper free from chemicals tending to attack the steel, or solid impurities imbedded therein which might mar or scratch.

This paper is retained throughout blanking, punching, bending and some drawing operations in the press room, and more than pays for itself in the handling scratches and die marks eliminated by its use.

It must not be so porous as to absorb all the oil or grease on the surface of the sheet, permitting the steel to rust, but it must be sufficiently porous on its surface to adhere intimately to the oily stock surface and must be flat and smooth on the sheet to avoid wrinkling which would leave a mark on the stock when subjected to pressure.

The paper must cover the entire strip neither overhanging sides or ends, nor being narrower than the strip itself.

4. Boxing

The strips must be boxed in convenient handling weights not to exceed, say 500 pounds, and so held therein that no detrimental motion can occur in handling or shipment. The boxes must be bound and nailed securely for the same reasons and be of sufficient thickness of wood to

withstand all reasonable handling without breakage. The gauge width and length of stock and net and tare weights must be plainly marked in stencil on box tops along with the notation "best side up", which packing must be satisfactorily checked by the rolling mill shipping inspector. Also the net weight must be plainly stamped on one end of the box so that when piled, the total weight may be computed by reading the ends.

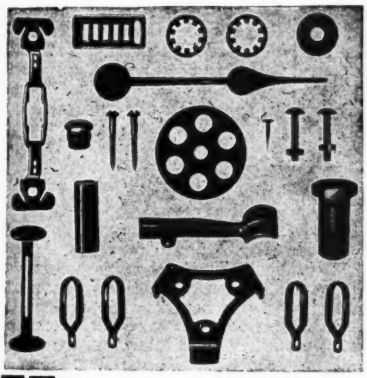
In use, the top of the box must always be opened and the stock kept with the best side up with its paper kept thereon throughout the press operations in order to keep the best side for the finish side.

5. Temper

This is best determined by agreement with the mill after a sample piece or drawing have been submitted to them, but experience has demonstrated that a "B" Rockwell of 45 to 55 will take care of all average press room operations satisfactorily and the low range hardness is preferable, since, if the stock is to be stored for any length of time, it is subject to an age hardness process that may go as high as five points. As a general rule, the closer the hardness is held to 48, the better the bending and medium drawing qualities will be, provided the mill has selected properly cropped billets of the correct carbon and other constituent content.

6. Grain Size

This subject is not so well known or understood either by platers or mills in its relation to finish, but in general, the finer the grain size for any given hardness the better looking will be the bends and draws in the finished product. There are so many number and size nomenclatures used by various mills that exact specification might in some cases be mislead-



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ing and the best procedure in this case as in section 5 is to have the mill guarantee to deliver a grain size compatible with their hardness which will make the bends and draws required by your sample or drawing free from egg shell, orange peel or breaks of any kind, and time permitting, the mill should submit samples for trial on your dies before rolling the whole shipment, at which time you may make or have made your own microscopic grain size count and see that future shipments adhere to the original specifications.

No amount of good steel can be profitably used without the correct methods for processing, but the scope of this paper does not permit a discussion of these features. They will be contained in a later paper.

In closing this paper, full acknowledgment and appreciation is given to Mr. Frederick Fulforth of Philadelphia, Pa., an outstanding electro chemist, research engineer and consultant, for his invaluable assistance in the formulation and preparation of the specifications covering rolled strip steel as embodied in this paper.

It might be pertinent to also say that to any modern mill this specification should present no difficulty or production delay. If you are unable to secure material of this character, Products Finishing will be happy to suggest sources of supply from mills that are equipped to produce these higher types of rolled strip steel.

The moving thought behind the whole paper is to enable a manufacturer to produce a higher quality of merchandise at no more and probably less cost; to speed up his production with far less difficulties in his finishing department and finally to give to the ultimate consumer a better product at no advance in the purchase price, factors which we believe are decidedly important in present day production.

F-M Bulletin 1410. Fairbanks-Morse vertical hollow and solid shaft polyphase, ball-bearing, squirrel-cage, induction motors are described in Bulletin 1410, published by Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. Although these motors were developed primarily for direct connection to vertical-shaft turbine, propeller and centrifugal type pumps, they have found wide application on special machine tools and various other industrial equipment.

Hollow shaft vertical motors are particularly adapted to turbine pump application because of the ease of installation, assured permanent shaft alignment, weather-proof construction, high thrust capacity and compact design. The upper motor bearing supports the entire load on the pump shaft, including the weight of shafting and rotating parts of the pump, as well as the thrust load of the column of liquid being lifted. The exterior design of the motor and its ventilating openings make the machine weather-proof so that it can be operated in the open all year around without injury. Adequate ventilation is provided by sturdy fans at both ends of the rotor. Rain water or other liquids will not blow into the windings.

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Copy of Bulletin 1410 free upon request.

Jarvis High Speed Rotary Files. This bulletin, issued by The Charles L. Jarvis Co., Gildersleeve, Conn., displays the new Jarvis "Ground from the Solid" High Speed Rotary Files in 24 different styles and shapes. The illustrations are made to the actual size of the files, making it easy to select the type required for the work at hand. These files are produced from solid stock. The various shaped blanks are machined and hardened, the final operation consisting of grinding the flutes or teeth into the solid hardened blanks. All Jarvis Rotary Files have an overall length of 2½ in. including shank. Copy of the bulletin free upon request.

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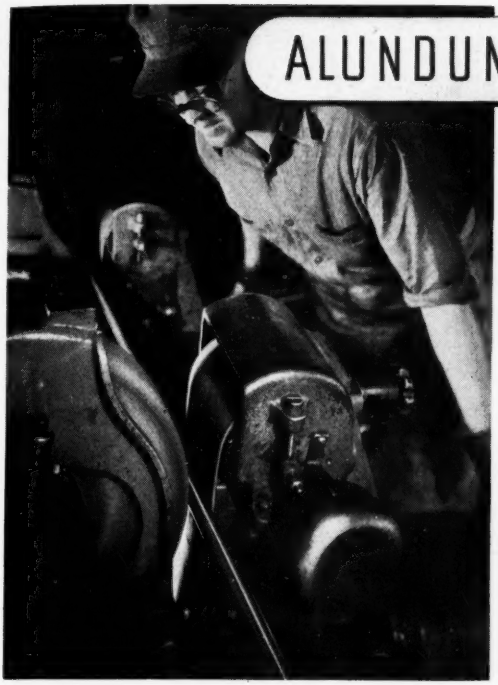

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NORTON ABRASIVES

Dust Control in Industry

By C. C. Hermann

Eastern Representative, Claude B. Schneible Co.

So many men in industrial plants have asked the question, "How should I go about removing the dust from such operations as grinding, sand blasting, milling, and so on?" that it seems pertinent to give some specific examples as the basis for an article on the subject. It is true, there are handbooks on the subject to which such inquiries may be directed, however, the information usually found in handbooks is not considered specific enough for average use. Some years ago the writer supplied a certain magazine with an article on the design and operation of dust removal systems. The article was published and found its way into the library of a central west city. One day an engineer came into my office to discuss the design of such piping. He said he had searched the libraries for specific information on the subject and found only one article which applied and that article was the one I had written.

Of the various phases to be considered in the design of a dust conveying system and dust removal system the most important is velocity. Quite recently I was told that trouble had been encountered in a pipe system from the solids settling out of the air stream in the horizontal runs. To overcome this condition, the pipes were re-installed with sufficient slope to cause the material to collect at the bottom of the run and there discharge. The trouble was initially one of velocity. It could have been eliminated by increasing the air velocity in the pipe.

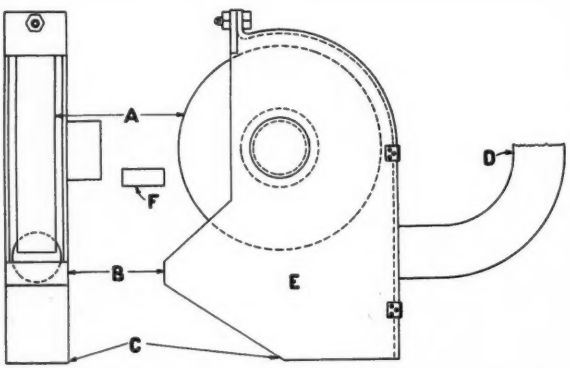

Fig. 1—Diagrammatical view of a grinding wheel and hood. The dust hood is shown at B and the grinding wheel at A.

Another phase of the problem which baffles the average man is face velocity, or the velocity required to pick up the dust particles at the point of production. To make the term face velocity clear to the reader reference can be made to Fig. 1 which illustrates a grinding wheel A, dust hood B which also serves as a safe guard, cleanout C and the conductor pipe D. A side E of the hood is hinged so that the wheel may be changed. A work rest is shown at F. The face velocity is the average velocity of the air into

the hood space around the projecting portion of the wheel. The free area around the wheel must be determined by measurement and calculations and this figure multiplied by the face velocity gives the volume of air to be exhausted from the hood through the conductor pipe D. The various dimensions of the hood change for different size grinding wheels. The reader is referred to the standards as adopted by the American Foundrymen's Association for the complete dimensions.

Material	Specific gravity	Face velocity ft. per min.	Velocity of air in pipes Branches	Main pipe
Antimony	6.7	1140	5500	5000
Asbestos	2.4	408	4500	4000
Brass	8.4	1528	5500	5000
Cement	2.8	476	4500	4000
Corundum	3.9	663	4500	4000
Silica	2.7	459	4500	4000
Quartz	2.7	459	4500	4000
Porcelain	2.4	408	4500	4000
Limestone	2.7	459	4500	4000
Flint	2.6	442	4500	4000
Glass	2.5	425	4500	4000
Cork	0.24	40	3500	3000

It is obvious that different face velocities must be used for different materials to be exhausted. This is because of the variation in the weight or density of the materials. The above table gives some of the more common materials encountered in industry, the specific gravity, face velocity and pipe velocities to be used in the design of dust handling systems.

Refer to Fig. 1 and assume that an abrasive wheel is being used, the abrasive having a specific gravity of 3.9 calling for a face velocity of 663 ft. per minute. Further assume that the wheel is 16 in. diameter and 3 in. face. From the standards, we find that the area between the hood and the wheel totals 0.75 sq. feet. The volume of air to be handled in order to provide adequate ventilation of this wheel would be 0.75x3.9x170 or 497 cu. ft. per minute. The figure 170 is a constant which is used in practice and when multiplied by the specific gravity of the material to be conveyed gives the required velocity of the air in ft. per minute.

To make further practical use of the information which we now have available reference is had to the layout of a typical ventilation plan for a grinding room shown in Fig. 2, which is a plan view of the piping leading to the various machines. In Fig. 3 an elevation of the system is shown. It is necessary to have a layout of the wheels with all necessary dimensions before the piping system can be designed, since the velocity, volume and frictional resistance of the piping must be determined. The following table gives all the necessary calculations and measurements with extensions showing the frictional re-

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sistance of the piping system, collector and fan size.

It will be observed that the term equivalent length is used in the above table. This is the length of the straight pipe plus the equivalent length accounted for by elbows and reduction pieces. Good design dictates that all elbows should be designed with a throat radius equal to 1½ times the pipe diameter. For this type of 90 degree elbow, the resistance is approximately equal to a straight pipe whose length is six times the diameter. A 12 in. diameter, 90 degree elbow would therefore have a resistance equal to six feet of straight pipe. The resistance of piping for a given velocity of flow may be taken from tables of pipe friction found in any standard handbook. The velocity head mentioned above is the equivalent water gauge for the given velocity and is determined from the standard velocity formula found in all handbooks which is $V^2=2gh$ in which V is the velocity in feet per second, g is the acceleration due to gravity and h is the height or the air column equivalent to the given velocity in feet. The final result is, of course, reduced to the water column basis. The working out of a typical example will illustrate the method.

Section of system	Dia. of pipe in.	Area sq. ft.	Equiv. lg. ft.	Vol. CFM.	Vel. f/m.	Friction loss Per 100 ft.	Total
A	4 in.	0.0873	17 ft.	392	4500	10.5	1.785
B	4½ in.	.1104	3 ft.	392	4000	8	.24
C	6 in.	.1964	6 ft.	784	4000	5.5	.33
D	7½ in.	.3068	5 ft.	1176	4000	4	.20
E	8½ in.	.3942	4 ft.	1568	4000	3.5	.14
F	9½ in.	.4923	21 ft.	1960	4000	3	.63
G	14½ in.	1.1460	3 ft.	4312	4000	1.6	.048
H	15 in.	1.2270	1 ft.	4704	4000	1.7	.017
I	18 in.	1.7670	1 ft.	5096	3000	.67	.007
Total pipe loss water gauge							3.397 in.
Collector loss water gauge							2.750 in.
J	18 in.	1.7670	28 ft.	5096	3000	.67	.188
Velocity head water gauge							1.249
Total loss of system in inches water gauge							7.584

From the foregoing we note an entrance velocity of 4500 ft. per min. which is equivalent to 75 ft. per second. The acceleration due to gravity is a constant and equal to 32.16. Substituting the quantities in the formula we have h equals $75^2/2x32.16$ or 87.45 feet. The weight of air per cubic foot at 70 deg. F. under atmospheric pressure of 29.92 inches mercury is 0.07425 which multiplied by the height of the air column or 87.45 ft. gives 6.493 pounds per sq. foot. This is converted to inches of water by the following arrangement: inches water gauge equals 6.4932x16x1.732/144 or 1.249 which is the velocity head used in the above tabulation. Note that one ounce per sq. in. is equal to 1.732 inches of water, also 144 is the square inches in a square foot and 16 is the number of ounces in one pound.

Having the total loss of the system in inches of water and referring to a manufacturers table on fans it is an easy matter to select a fan to serve the system and also the horse power required to drive the fan. It is advisable to refer this portion of the work to a fan engineer representing the company from whom the fan is to be purchased for assistance in the selection, since various fans have different characteristics understood usually by the sales department of the manufacturer. A fan recommendation will then be made to serve the system.

It is to be emphasized that in all

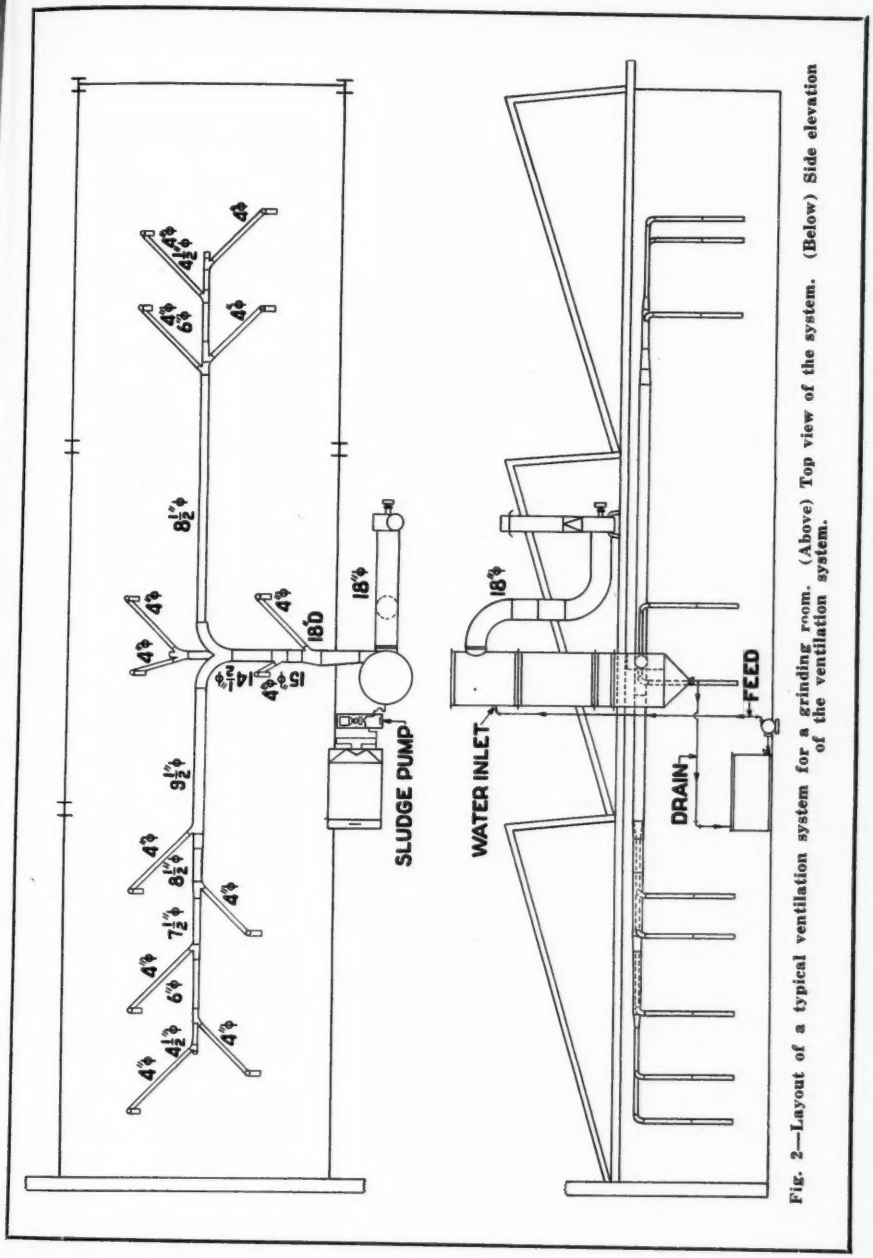

Fig. 2—Layout of a typical ventilation system for a grinding room. (Above) Top view of the system. (Below) Side elevation of the ventilation system.

cases the fan should be installed on the clean air side of the system to avoid the abrasive action of the dry dust. It has been determined by experience in the field that dry abrasive material carried in the air possesses a decided abrasive action on fan blades to the extent that fan failures have been frequent, however, it has also been amply demonstrated that this abrasive action of the dust has been practically eliminated by impinging the dust on wet surfaces.

A few words regarding the piping system will assist those not entirely familiar with dust handling. The piping should be made of heavy copper bearing steel, the gauge depending on the dust loading of the atmosphere handled. In the average system 16 and 18 gauge galvanized iron will have long life, the straight piping being made of the lighter gauge and the elbows and reduction pieces of the heavier gauge. As the pipe size increases, the weight of the material should be increased. For piping 8 in. diameter and under, 18 and 20 gauge material may be used; up to 14 in. dia. 16 and 18 gauge; and for sizes 16 in. to 20 in. it would be advisable to use 14 and 16 gauge material.

All joints of the pipe should be made tight by soldering and riveting. In heavier gauges and using black iron, welding may be resorted to in order to have a tight job and prevent the possible sifting of dust into the atmosphere from poorly constructed joints. Pipe clean-outs should be included in the system, located on the bottom of the runs and at dead ends. They should be spaced about 16 feet apart which will permit ample cleaning out and inspection. No dampers should be included in this type of system as the closing off of air at any time will result in lowering the velocity in the mains to the point where material will fall out of suspension and result in loading of the pipe system producing a hazard. All piping should be amply supported with flat strap iron on eight foot centers securely bolted to structures above.

"Pentrate Black Finish." This is the title of an attractive four-page folder which is now being issued by the Heatbath Corporation, 242 Westfield Ave., Springfield, Mass. Pentrate is a penetrating color paint which provides a means of applying an attractive, low-cost black finish to steel through a process of chemical action. This folder states that the Pentrate process is one of immersion in a solution composed of specified proportions of Pentrate crystals and water, operating at a temperature of approximately 300 deg. F. The parts may be handled in wire mesh baskets upon fixtures, depending on their size and shape.

Pentrate can be successfully applied to practically all steels with the exception of the high chromium stainless types. Because of the fact that it is a penetration of the metal rather than the coating, it is particularly adaptable to the finishing of threaded parts or pieces that must fit closely together in assembly.

Also included in this folder is a list of ten easy steps describing the application of Pentrate. Copy of this folder free upon request.

TAG Industrial Thermometers. A new industrial thermometer catalog designated as "No. 1125B" is now being issued by C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y. This catalog contains 24 pages of conveniently arranged listings of the complete line of TAG Industrial Thermometers. Its pages are filled with highly pertinent information about the construction of these instruments with many interesting illustrations which clearly show the various forms and connections that fit the application.

In addition will be found many miscellaneous thermometers including metal and wood back, cup case, and so on. Hygrometers, U-Gages, Mercurial Vacuum Gages and Mercurial Barometers are also clearly illustrated and completely described. A copy of Catalog No. 1125B free upon request.

"How to Increase Your Sales" is the title of an effective book just published

by the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago, Ill. Written by an authority on the preparation of sales manuals, its 92 pages are filled with information, which, if followed by any salesman should result in greater sales of everything from a coffee pot to a major appliance.

"Getting a raise is serious business", is the book's opening statement, and it is pointed out in the foreword that while porcelain enamel can help every home appliance salesman increase both the number of units sold and the unit value for each sale, the book is not about porcelain enamel. "This book is about selling", the foreword reads. "Naturally some of the sales examples are built around porcelain enamel, so that you can readily see how to use the life-time finish as a sales-building tool. But you won't be burdened with a lot of technical information about complicated formulae, high temperatures, involved manufacturing processes and other such subjects."

In the chapter titled, "The Right Slant on Salesmanship", the following statement is emphasized and amplified: "Selling is the job of making the prospect understand his need for what you have to sell." Another effective statement is: "Price selling is the apology business demands for buyers' mistakes and for salesmen's laziness and inefficiency."

"What People Buy" is the title of Chapter II, in which it is pointed out that "People always buy advantages", and "Selling is the job of making the prospect understand his need for what you have to sell."

The four basic reasons of "Why People Buy", which is the caption of Chapter III, are given as: (1) The buying reason of gain. (2) The buying reason of safety. (3) The buying reason of convenience. (4) The buying reason of pride. Each of the reasons is explained in detail.

This is followed by a chapter on "How People Buy", in which the book stresses the three decisions that govern all buying—the need, the price, and the time. "An understanding of how people buy is valuable to any salesman for two principal reasons", the book says. These are: (1) "The three decisions mark the route to the close. They provide a bas's for planning a sales talk—a presentation and a demonstration. (2) The three decisions also enable you to determine just how your sales effort is progressing. They are definite points to check against during the progress of any sale—easy or difficult."

"How to Handle Objections" is one of the book's most interesting chapters. Such captions, which are self-explanatory, as "Objections vs. Stall", "Find That Missing Buying Decision", "Plan for Handling Objections", "Anticipating Objections", "Turning an Objection into an Advantage", and "Ask for the Order", appear throughout.

The three concluding chapters, of utmost importance to the salesman, are: "How to Close", "Summing It Up", and "After the Sale is Over."

Copies of the book may be obtained without charge by writing to the Porcelain Enamel Institute, 612 N. Michigan Ave., Chicago.

Alloy Metal Wire, Rod and Strip Data Booklet. The Alloy Metal Wire Co., Prospect Park, Pa., has just published for all users of wire, rod and strip in the electrical, chemical and mechanical fields, a helpful handbook of information and data on alloys.

This booklet contains finger-tip facts on a wide variety of alloys used in wire, rod and strip form. In addition to listing the description, application, and price per pound of alloys, it contains wire data, the range of uses, current temperature characteristics of wire, resistance, and feet per pound.

In the electrical field, where high temperatures and resistance to oxidation are most important, data on the forms of alloys to be used is set forth. For the engineer desiring facts on alloys, both of high electrical resistance used in all types of electrical measuring instruments and fine low temperature resistance units . . . this booklet supplies the data for the problem in hand. Recommended uses and data on wire, rod and strip of Monel and non-corrosive steel are also given.

Since much of the development work on alloys in radio tube and incandescent lamp manufacturers has been pioneered by the Alloy Metal Wire Company, the suggested uses for other applications in the electrical industry should prove valuable.

As set forth in the foreword, for more than twenty years, the desire of the Alloy Metal Wire Company has been to supply the best obtainable products for use in the chemical, electrical, radio and mechanical fields. This booklet will prove helpful in assisting to select wire products of dependability.

Copy free upon request.

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Applying a Rust-Resisting Finish to Steel Sash by Production Methods

By H. H. LaCrosse

THE increasing popularity of steel windows in both industrial and domestic construction has increased the pressure on manufacturers of this type of product for a more adequate method of finish that would provide adhesion for paint and assure protection from rust.

The problem was not easily solved. First, the peculiar type of exposure made the sash especially subject to rust; second, being immediately under the eyes of the owner all the time, continued fine appearance was necessary and; third, the burden of reconditioning cost had to be reduced.

During recent years, various types of rust-preventing metallic plates and phosphate coatings have been used with some success as stable bases for paint finishes, but it was not until the Parker Rust-Proof Company, Detroit, Michigan, developed an accelerated type of Bonderizing process that would work rapidly on hot rolled steel with ordinary alkali cleaning, that any of these methods lent themselves to production application on a continuous conveyor line.

The first concern to install this improved process for treating steel sash has been the Detroit Steel Products Company, Detroit, Michigan, for finishing "Fenestra" steel windows and this company has been so impressed with the possibilities of this finishing method that they have erected a new two-story building, 40 ft. wide and 234 ft. long in which to house their equipment, which carries the production through every stage of finishing from initial cleaning to the final baking of a dip coat of primer and cooling down to room temperature.

As the production reaches this new building, the

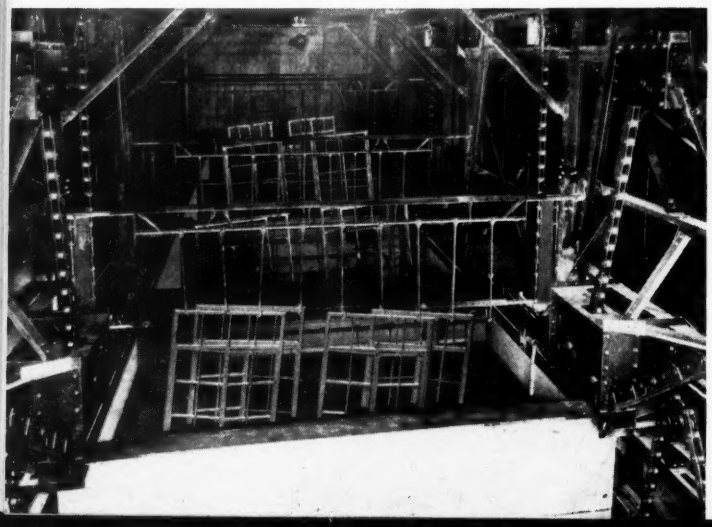

Fig. 1—This view shows the Bonderizing and rinsing tanks.

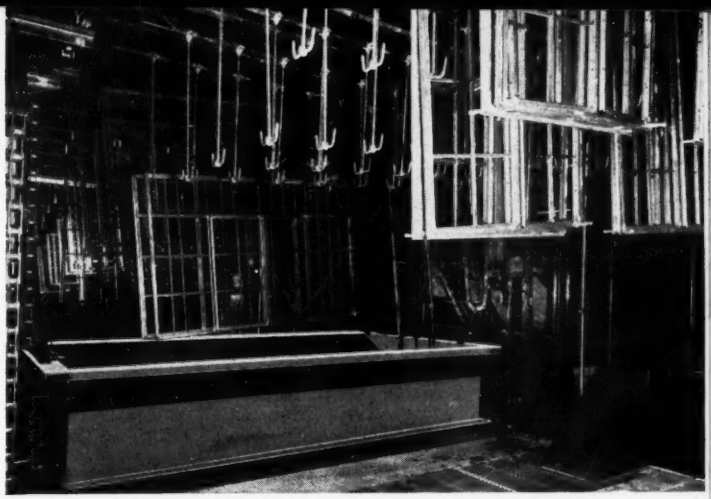

Fig. 2—Illustration showing 3,500 gallon paint tank in which a primer coat is applied.

swing leaves of the Fenestra steel windows are first locked in an open position to make sure that the finishing process reaches inner surfaces and corners. The windows are then hung on carrier racks on a process conveyor, which takes them into a cleaning tunnel.

The cleaning tunnel is 57 ft. long, 6 ft. wide and 17 ft. high. The windows pass through "edgewise", while at the same time 400 pressure jets of hot alkaline spray, played from both sides of the tunnel, thoroughly removes all dirt and oil, and are then rinsed by 200 jets of steaming, clear, hot water.

Thoroughly cleaned and rinsed, the windows move out of the tunnel and around a corner to a position in front of the Bonderizing tanks where they are automatically transferred from the cleaning conveyor to a transverse conveyor.

In this section, the windows are dipped progressively into four separate tanks, each of which has a capacity of more than 7,000 gallons.

The first tank contains clear, hot water, the temperature of which is maintained at 200 degrees F. by heating coils along the interior of the tank walls. A dip of 72 seconds heats the window to the proper temperature.

The second tank contains Bonderizing chemicals maintained at a temperature of 180 degrees. The immersion time is 3 minutes. The third tank contains cool water in which the window is immersed for 72 seconds to remove any excess Bonderite salts.

The fourth tank contains a dilute chromic acid solution at 200 degrees. The windows are immersed in this tank for 72 seconds to improve the paint base.

From the fourth tank, the windows progress through a "blow off chamber" where a workman with an air hose blows off the moisture that collects in frame and ventilator corners. By means of the conveyor system, the windows are taken to the cooling chamber.

The time required for a window to pass through the cooling tower 25 ft. above the floor is 15 minutes. In this period, its temperature drops from 200 degrees (the temperature maintained in the chromic acid bath) to 95 degrees at which temperature it enters the 3,500 gallon paint tank and remains in this tank 1½ minutes to receive a gray priming coat.

The temperature of 95 degrees is pre-determined and controlled, both winter and summer and is a vital factor in the painting process, since the paint formula is specifically adapted to dip application at this temperature.

Carried upward again, after their dip into the paint tank, the windows travel through a 74 ft. baking oven, a journey that requires 45 minutes.

Air at a temperature of over 300

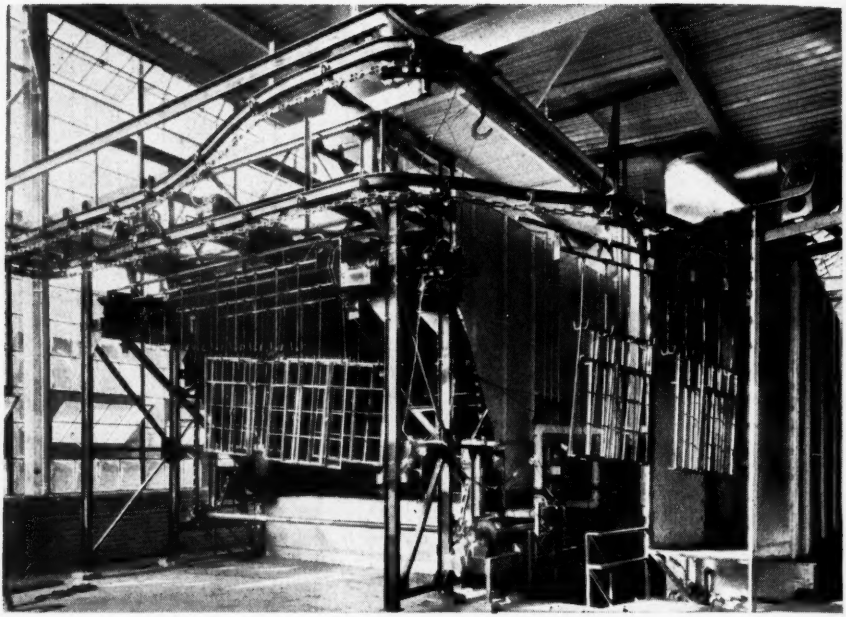

Fig. 3—The illustration herewith shows the Fenestra steel windows emerging from the cleaning solution.

degrees is forced through conduits on the floor of the oven and out through apertures spaced several feet apart. Automatic controls regulate the temperature and hold it constant within one or two degrees plus or minus so that the newly applied paint coat is subjected to a thorough, even, baking process. The result is a tough, durable, glossy finish, "keyed" into the surface of the steel.

It is claimed that accelerated tests made before this equipment was installed, both in the salt spray and humidity, indicated that Bonderizing increased the finish life all the way from three to five times as against priming over metal cleaned and not Bonderized.

The outstanding benefits claimed for this method are that it provides a tough, durable base coat that improves appearance and the lasting qualities of all finish coats that may be applied later, protecting the building owner against untimely and unnecessary reconditioning costs.

"Ford High Speed Rotary Files Cut By Hand." This is the title of a three-page folder which is now being issued by the M. A. Ford Mfg. Co., 417 Pershing Ave., Davenport, Iowa, in which Ford Hand Cut Rotary Files are illustrated and described. A table describing the files illustrated in the folder is to be found on the last cover. Included in this table are the diameter of file in inches, length of body in inches, diameter of shank in inches, length overall in inches, and the prices.

A copy of "Ford High Speed Rotary Files Cut By Hand" free upon request.

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PRACTICAL APPLICATION of MODERN EQUIPMENT

Ninety-six Foot Oven Facilitates Enamel Baking

A 96 ft. oven manufactured by The Kirk & Blum Mfg. Co., 2816 Spring Grove Ave., Cincinnati, Ohio, was recently installed at F. H. Lawson Co., Cincinnati, Ohio. The work processed by F. H. Lawson Co. consists primarily of sheet metal ware such as utility cabinets, clothes hampers and metal containers of all kinds. The various workpieces are finished with enamel and in order to obtain permanent finishes and at the same time speed up production, the enamel must be dried and baked. The oven in which the work is baked is approximately 96 ft. long, 7 ft. high and 5 ft. wide.

Heat is provided from a centrally located heater which is manufactured by the Maxon Premix Burner Co., Muncie, Indiana. A blower is provided for circulating the heated air through the unit. All metal trucks are used to convey the work through the oven. The time required for baking the enamel on the various workpieces is 53 minutes. The temperature is maintained at 225 deg. F.

Illustration showing a Kirk & Blum Continuous Drying Oven which was recently installed at F. H. Lawson Co., Cincinnati, Ohio.

the FINISHING FORUM

Do you have a finishing problem?

Through the cooperation of outstanding authorities in the fields of metal cleaning, plating, burnishing, lacquering, and so on, Products Finishing is prepared to aid you in the solution of your finishing problem. There is no charge for this service.

Also . . .

If there is a "kink" or short cut in use in your shop, send in a description of it. . . . Each one published will be paid for.

Question: We are nickel plating small sheet steel parts in a barrel or tumbler. Occasionally we experience trouble with peeling and cracking of the plate on the sharp edges of the work. We are submitting a sample of our solution for analysis and ask that you give us your recommendations.

Answer: The analysis of the sample of nickle solution submitted is as follows: Nickel sulphate (single nickel salts), 20.6 oz. per gal.; Chloride (calculated as nickel chloride), 12.5 oz. per gal.; Boric acid, 1.5 oz. per gal.; pH 6.1. The nickel content and the chloride content of this solution are at the proper operating points, but neither should be allowed to increase to any great degree. The boric acid is low and should be brought up to 3.0 oz. per gal. by the addition of an additional 1.5 oz. per gal. This will tend to stabilize the pH and eliminate the brittleness that is described above. When necessary to correct the pH, sulphuric acid should be added if the pH is too high, and ammonia should be added when the pH is too low. The proper operating pH is around 5.8 for this type of bath. The slightly lower pH will tend to decrease the tendency for the plate to flake off sharp edges.

The anode area in a barrel plating solution should be as great as possible without causing an excessive increase in the metal content. This is so that the maximum possible current can be forced through the barrel. The speed of rotation of the barrel is also important and should be from 2 to 5 revolutions per minute. The solution should be cleaned either by filtration or siphoning every two or three months.

The chief cause of peeling and flaking of an electrodeposit is faulty cleaning. Steel parts should be cleaned from 3 to 6 minutes in an electrocleaner recommended for the particular job at hand, and pickled from 5 to 10 minutes in 10 per cent of muriatic acid. Of course it is necessary to have clean rinse water and observe the rules of care and cleanliness that good plating demands.

(Answered by Ezra A. Blount).

Question: We have been doing considerable experimenting in an effort to secure a satisfactory oxidized finish on a line of small brass parts. We have a small open end brass bar-

rel, and can you advise us whether there is any method for oxidizing brass in a barrel operation?

Answer: In the Naugutuck Valley in Connecticut where perhaps brass finishing has reached its highest efficiency, various finishes are regularly applied by the barrel method. In oxidize finishing brass, the practice is to first plate the parts with cyanide copper, then clean with a good alkaline cleaner. Rinse the work thoroughly, place in the barrel and cover with water, then add from one to two ounces of ammonium sulphide, then operate the barrel until the desired color is obtained. Rinse the solution out of the barrel cleanly and then run the work for a few minutes in a mild soap solution, after which it should be rinsed in hot water and dried out with fibre meal, after which, to secure permanence, the parts should be lacquered.

Question: Your paper on the selection of fibrous materials for burnishing was of especial interest to us as we have a fair amount of scrap leather to dispose of in the form of belt ends, rands and miscellaneous pieces. What is your opinion as to the use of leather scrap in such applications as you mentioned?

Answer: Leather scrap is used quite extensively in barrel finishing, but the most popular and we believe the most efficient is the trimmings from die cut pieces of either sheep or light weight calf skin, as used in the manufacture of suspender and garter trimmings and this type of work. Scrap of this type is used almost exclusively in the polishing operation in the manufacture of steel balls after the final lime or crocus finish. In the manufacture of knitting needles a heavier type of leather scrap, cut into small pieces then oiled and sprinkled with very fine emery is used for deburring and polishing the needles. We have some doubt as to whether a chrome tanned leather scrap might be used. Now as to coating such scrap pieces with flexible glue and then covering with abrasive, it is possible that this can be worked out for some applications and we will conduct some experiments on the sample material you are supplying, a later report of the results will be made in the Forum.

(Answered by H. Leroy Beaver).

Hilo Bulletin No. 15. The five Hilo Rip-pls manufactured by Hilo Varnish Corporation, 42-60 Stewart Ave., Brooklyn, N. Y., are described in an 8-page bulletin designated at "No. 15." The Hilo Rip-pls give attractive, wave line effects in one coat when applied to non-porous surfaces. Their films are hard and tough, resistant to water, alcohol, and grease.

Each of the five Hilo Rip-pls is a distinctly different material from any of the others and each gives a particular effect, both as to character of the wave line, fineness and the degree of lustre. The five kinds are as follows: a fine gloss, a fine dull, a medium width line, a crater like effect, and a coarse line with fair lustre. While the five kinds are illustrated in this bulletin in black, each may be obtained in almost any other color.

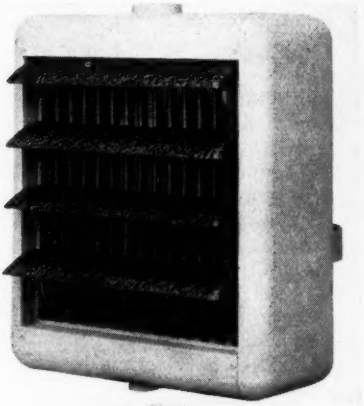
Practically any two-color combinations or shading may be obtained by first applying a coat of Rip-pl, of any desired color, and over this a thin coat of lacquer enamel or oil enamel of the second color.

Metallic effects may be obtained either by mixing the metallic powder with the Rip-pl or by first obtaining the Rip-pl finish and putting over it a coat of lacquer or enamel containing the metallic powder. By mixing the powder in the Rip-pl, almost any degree of metallic effect can be obtained, from the solid coating of much powder to just a few metallic specks showing through the Rip-pl.

The five Hilo Rip-pls are said to be easy to apply and require no special treatment other than sufficient baking heat. A copy of Bulletin No. 15 free upon request.

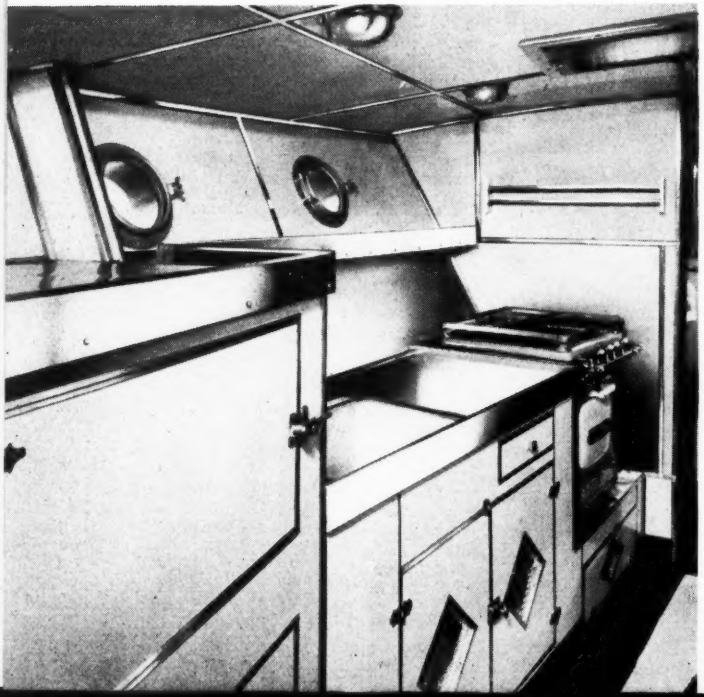
FINISHES THAT AID IN APPEARANCE AND UTILITY

(Right)—This industrial heater is "dressed" in a sturdy art-metal finish that can be applied on castings or stampings. This type of finish requires no filler undercoat, covers in a single coat, and bakes to a fine, perfect texture even on corners and beads.

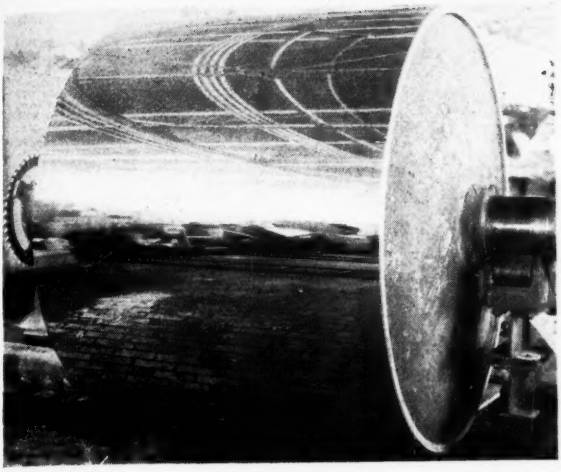


(Photo Courtesy Sherwin-Williams)

(Photo Courtesy American Nickeloid Co.)



(Left) — Peering through a porthole, this is how the galley of a modern cruiser appears. The ceiling and wall panels, refrigerator top and sink drainboard are fabricated out of prefinished chrome-copper, which is attractively satin finished. This finish is highly resistant to food acids.

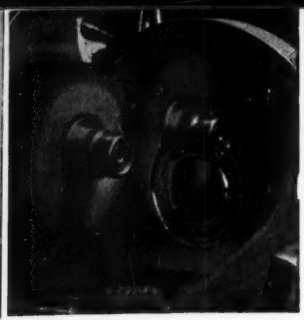


(Photo Courtesy Lukenweld Inc.)

(Left)—Shown herewith is a steel dryer, six feet in diameter for use in the paper, soap, pharmaceutical, textile, and chemical industries. The outer shell of this dryer is plated with a lustrous, non-rusting chromium finish.

(Photo Courtesy American Rolling Mill Company)

(Right) — Many progressive merchants choose a pleasing combination of porcelain enamel and stainless steel such as shown herewith, in order to make the interiors of their stores more attractive with equipment that will have a permanently fresh appearance and at the same time assure easy daily cleaning.



NEWS OF THE INDUSTRY

Pangborn Holds Open House

A pleasing demonstration of good will between the management of Pangborn Corporation, Hagerstown, Md., and company employees took place recently when more than 1,600 persons enjoyed the unrestricted hospitality and freedom of the Pangborn plant. All employees were given a holiday with full pay and at the same time were invited to use this time, if they so desired, to bring their wives, children, and parents to the plant in order to show their families their individual jobs and the work Pangborn does collectively.

From 9:00 o'clock in the morning until 2:30 in the afternoon the guests enjoyed "open house" and inspected at leisure every place from the president's office in front to the far depths of the foundry in the rear.

Each family group was welcomed personally by Thomas W. and John C. Pangborn. Passing from the new office building into the shops, employees and their families were invited to inspect the many special prizes ranging from a 10-tube radio set to electric clocks and irons and were asked to help themselves to candy, cigars, cigarettes and soft drinks. At 11:30 an excellent cafeteria style luncheon platter was served to each person.

Both employees and management voted the day a great success and there is no doubt that the more than 500 families represented in attendance now have a much clearer understanding of the daily work carried on at the Pangborn plant.

Parker Rust-Proof Makes Addition To Detroit Plant

A new building to provide additional office and laboratory facilities for the Parker Rust-Proof Company, 2172 East Milwaukee Ave., Detroit, Michigan, is now under construction on East Milwaukee Avenue. The new addition, adjacent to the present building, will be a two-story fire-proof structure extending 148 ft. along Milwaukee Avenue. The front will conform architecturally with the present building.

The need for the new addition comes as a direct result of an intensive expansion program which was begun in 1926. While in the early days, a single chemist was able to conduct the research activities, these activities now occupy the attention of a large staff of laboratory experts, each a specialist in some particular phase of rust-proofing.

The present service, research and testing laboratories with a personnel of 35 graduate chemists, the new legal and engineering departments and the greatly enlarged general office force require additional working space. The new building will make available twice the present office and laboratory room.

One portion of the ground floor of the new addition will be devoted to an enlarged testing and demonstration laboratory equipped with the latest precision instruments and equipment for testing and studying surfaces. The rest of the space will be devoted to a sheet metal shop and storage space for rust-proofing chemicals.

The second floor will be devoted exclusively to office and laboratory space. This will provide enlarged and improved facilities for the legal, engineering, filing, and accounting departments. The latest lighting and ventilating equipment will be used and fire-proof vaults installed to protect important records, drawings and blueprints.

With the additional space released by the removal of the offices into the new addition, Parker will have probably the largest laboratory in the country devoted exclusively to the problems of rust control and prevention; their work being concerned with two very important fields — testing and research.

In the testing department, Parker chemists render a technical advisory

service to all customers and maintain a constant chemical control over the installations of their clients. This service, as the use of Parker Processes has rapidly expanded touching practically every industry dealing with metals, has become very large and has required more and more facilities.

Parallel with this growth in the testing department has been the expansion in the research field. In an effort to constantly improve the Parker Processes to adapt them to meet changing conditions, Parker chemists have succeeded in cutting the processing time from an hour or more to a matter of seconds so as to make the process available for mass production in the automotive, refrigeration, air conditioning, building equipment and other industries. At the same time, they have been pushing forward in new avenues, chief among them being the recent development of processing methods for applying a paint holding and corrosion resisting coating to zinc surfaces. This was a very important step forward in the building industry and but one of the developments that the research chemists have made available to Parker customers.

The Parker chemists are constantly working on particular problems and individual needs and the Parker Rust-Proof Company hopes to be of an even greater service to industry and the public-at-large now that these additional facilities are made available for a more intensive research experimentation and investigation.

Ferro Establishes Four New Fellowships

As early as 1924, Ferro Enamel Corporation of Cleveland, Ohio, recognized the need for experiment and research in their comparatively new industry and established the Cushman Fellowship at Western Reserve University at Cleveland.

So gratifying were the results of the work accomplishd, that Ferro has just announced the establishment of four new fellowships to begin this fall at Case School of Applied Science, University of Illinois, Ohio State University and Alfred University.

This year the Cushman Fellowship has been granted to Nelson Perry Nies, A.B. and M.A. in Chemistry, California Institute of Technology. Working under the direction of Dr. H. S. Booth, Mr. Nies will continue the study of the fundamental reactions involved in porcelain enamel frits.

At Case, Mr. R. R. Schauss will devote all of his time to "Study of Factors Relating to Suitable Cast Iron for Leadless Enameling." This fellowship is under the direction of Dr. A. C. Coffinberry and Dr. H. A. Schwartz. The latter, besides being a lecturer at Case is also manager of research for the National Malleable & Steel Castings Company.

At the University of Illinois, under the direction of Dr. A. I. Andrews, Mr. Thomas L. Hurst, A.B. University of North Carolina, M.S. University of Washington, has been assigned the problem, "Physical and Chemical Study of Soluble Salts Present in Mill Liquors, Including Their Relation to Total Solubility and Selective Crystallization on Drying."

Mr. Warren B. Felter, B.S. in Ceramic Engineering, Alfred University, has been awarded the Fellowship at Ohio State University for research work on "Sagging: Causes of and Methods of Elimination." Mr. Felter will work under the direction of R. M. King.

The fourth Fellowship established this year is at Alfred University, Alfred, N. Y. This was granted to Mr. Wilfred Paquin for "Studies of Domestic Clays and Clay Blends; Methods of Improving Clays for Porcelain Enamel." Dr. C. R. Amberg is the director of this Fellowship.

Besides the five just mentioned, Ferro is also a contributor to the fellowship which is being carried on under the direction of the Porcelain Enamel Institute. Dr. Geo. T. Rankin, Ph.D., Ohio State University, holds the Fellowship on this project.

Along with this wide-spread work being done in universities all over the country, Ferro also carries on an extenstive research program in their own laboratories. Mr. G. H. McIntyre, Ferro's Director of Research, states that a large share of all the laboratory time is devoted to problems other than those involved in current manufacturing operations.

Houghton Appoints Harvey to Oil Department

David Maitland Harvey has been appointed superintendent of the oil department in the Philadelphia plant of E. F. Houghton & Company, 240 W. Somerset St., Philadelphia, Pa. The production of sulphonated oils, quenching oils, extreme pressure lubricants, and oils for metal working, textile, cordage, and fibre industries will be under his direction.

Prior to his present appointment, Mr.

Harvey spent six years at the Houghton plant in Manchester, England. His experience includes more than 20 years as superintendent of production for major oil and chemical manufacturers, including Standard Oil, Jacques Wolf, the Falk Company, and E. F. Houghton, with whom he was formerly associated just after the World War.

David Harvey

Mr. Harvey obtained his B.S. at Haverford College, 1914, and joined the Standard Oil of New Jersey for a 2-year training period before his first responsibility came as foreman of a cracking plant at Yale, Oklahoma, installing and operating a 12-still battery.

Dust Control Equipment Association Elects Officers and Continues Work on Standards

Arthur J. Tuscany, executive secretary and treasurer of the Dust Control Equipment Association, Penton Bldg., Cleveland, Ohio, announces that at the recent meeting of the Association held at Cleveland Hotel, Cleveland, Ohio, the following officers were elected for the ensuing period: Chairman, John Hellstrom, vice-president of the American Air Filter Company, Louisville, Kentucky; vice chairman, S. S. Parsons, Parsons Engineering Corporation, Cleveland. Mr. Tuscany continues as executive secretary and treasurer.

Announcement is also made of further progress in the organization's program which has been under way for some time, looking toward developing standards of dust control practice which will be of material help to the purchaser as well as the manufacturer of dust control equipment. In its work in this direction the Association is cooperating with the Hygiene Codes Committee of the American Foundrymen's Association, Committee Z-9 of the American Standards Association—dealing with fundamentals relating to the design and operation of exhaust systems, and also any work which the Air Hygiene Foundation may do in this connection.

At an earlier meeting Theodore Hatch of the New York State Department of Labor, discussed certain phases of dust control practice before the group, an invitation has been extended to the chairman of the A. F. A. Hygiene Codes Committee to meet with the Engineering Committee and the Association at the next meeting to be held in Cleveland.

The membership of the Association is comprised of the following companies: American Air Filter Company, Louisville, Ky.; American Foundry Equipment Company, Mishawaka, Ind.; Parsons Engineering Corporation, Cleveland, Ohio; W. W. Sly Manufacturing Company, Cleveland, Ohio; C. B. Schneible Company, Chicago, Ill.; Whiting Corporation, Harvey, Illinois.

Armco Announces Erection of Foreign Rolling Mills

The first continuous sheet rolling mill erected abroad has just been placed in operation in Germany and the second will be completed in England within a few months, according to officials of The American Rolling Mill Company, Middletown, Ohio. Both mills, designed to meet the growing demand abroad for better quality and more uniform sheets in the automotive and specialty industries, are licensed to use patents of The American Rolling Mill Company which developed the continuous rolling method now in general use in the United States.

The German mill, capable of rolling half a million tons of sheet iron and steel a year, has just been placed in op-

eration at Dinslaken by Vereinigte Stahlwerke, A. G. It is a 55-inch hot mill.

The English mill is part of a $50,000,000 steel project, complete from blast furnaces to finishing processes, being built at Ebbw Vale, Wales, by Richard Thomas Co., Ltd., Great Britain's largest producer of tin plate. It consists of a 54-inch hot mill and two cold reduction mills, and like the one in Germany, can roll half a million tons a year.

Vacuum Systems, Inc., Organized and Incorporated

An announcement has been made that Vacuum Systems, Inc. has organized and incorporated and is to have executive offices at 436 The Arcade, Cleveland, Ohio. This company has acquired all the assets of the Crescent Pump Co., Detroit, Mich., who formerly manufactured the Crescent Roto-Piston Dry Vacuum pump, together with exclusive manufacturing rights, titles, patents, patent rights, equipment, tools and so on.

Vacuum Systems, Inc. is now in readiness to service previously sold equipment, furnish parts, manufacture new pumps and accessories, fittings and all special tools and parts for special work suiting the principle and service of high vacuum power to a wider range of applications than has ever been attempted before. This company has retained the expert engineering services of William A. Hatcher, who will be at the end of the engineering department and general consultant for all vacuum problems.

The newly organized company will make it a point to render its best service to all the patrons of the former Crescent Pump Co., as well as direct its expert engineering attention to every conceivable new application in the manufacturing and technical arts and trades.

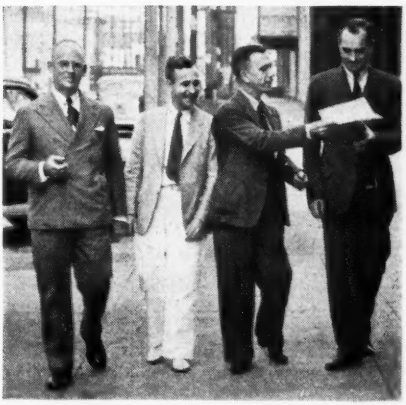
The officers of the newly formed company are as follows: president, Louis H. Mesker; vice-president, B. E. Hathaway; vice-president, H. W. Dosey; and secretary, W. L. Holloway.

New P&H Motor Agent for Minnesota

The Harnischfeger Corporation, 4535 W. National Ave., Milwaukee, Wis., has announced the appointment of the McCullock Sales Company located at 712 Western Ave., South Minneapolis, Minnesota, as an exclusive agent for P&H Motors for the entire state of Minnesota.

Atkins Foreign Representatives Visit Factory

Recently, Mr. Elstner Hilton, Atkins world traveler, and Mr. M. P. Mandry, Atkins representative from San Juan,



Elstner Hilton, A. J. Nugent, M. P. Mandry, and K. W. Atkins

Puerto Rico, visited the factory of E. C. Atkins and Company, Indianapolis, Ind., to discuss foreign trade activities. Both men had interesting reports.

Claude B. Schneible Makes Personnel Changes

Huga Korowske has become sales manager of the Claude B. Schneible Co., 3851 Lawrence Ave., Chicago, Ill., manufacturers of the Schneible Multi-Wash Dust Collector.

L. C. Beers, formerly in the southern territory, has been designated New England district manager, and now has headquarters at Springfield, Mass.

Carl Herman of Philadelphia will henceforth be in charge of sales in the New Jersey and New York metropolitan area, retaining his office at Philadelphia.

Noyes C. French, Ohio representative at Cleveland, has taken over additional sales territory including part of West Virginia and Kentucky.

John Liskow has been appointed chief engineer, and Carl Noderer — an old-timer in the dust suppression field, and one of the original employees of the company — becomes experimental engineer.

Solution Analysis Course Offered at Ohio Mechanics Institute

A course in solution analysis is now being offered at the Ohio Mechanics Institute for one semester beginning February 4, 1938. The class for this course will meet Wednesday night of each week from 7 to 9:30 p. m. This solution analysis course is a laboratory course in the chemical analysis of all kinds of plating solutions and the determination of the thickness of the metal deposited. Previous knowledge of chemistry or electroplating is helpful but not essential in this course. Both chemical and practical methods of analysis and control will be considered and compared.

Further information regarding this course can be obtained by writing Ezra A. Blount, Ohio Mechanics Institute, Parkway and Walnut Sts., Cincinnati, Ohio.

Hanson-Van Winkle-Munning Appoint Chamberlain As Distributor

Hanson-Van Winkle-Munning Co., Matawan, N. J. and Anderson, Ind., has announced the appointment of The Chamberlain Co., Inc., 2550 E. Olympic Blvd., Los Angeles, Calif., as distributor for Hanson-Van Winkle-Munning Co. products in southern California. The Chamberlain Co. is carrying a complete stock of supplies for the plating industry.

Hanson-Van Winkle-Munning Co. is the oldest and largest organization in the metal-finishing equipment and supply industry. The Chamberlain Co. was established in 1898 and has been in business continuously since that date. Jack D. Clayton, formerly representing the Hanson-Van Winkle-Munning Co. in Detroit, is acting as sales representative for The Chamberlain Co., Plating Supplies Division, in southern California.

Dr. E. H. Leslie Joins Technical Staff of Blaw-Knox Company

Dr. E. H. Leslie, authority on the chemical process industries, has joined the technical staff of the Blaw-Knox Company, 2040 Farmers Bank Bldg., Pittsburgh, Pa. In his new capacity, Dr. Leslie will be charged with the supervision of the design and fabrication of operating units for the chemical and oil refining industries.

Dr. Leslie is best known to the industrial world for his work as consulting engineer and for his operation, since 1923, of the Leslie Laboratories at Ann Arbor, Michigan. Through his researches, he has been prominently influential in the application of advanced chemical engineering to the problems of the chemical, petroleum refining, and processing industries generally.

Dr. Leslie received his bachelor's degree at the University of Illinois, with the class of '13, and the degree of Doctor of Philosophy at Columbia in 1916. For eight years, he was professor of chemical engineering at the University of Michigan.

Sullivan Machinery Company Appoints Alexander W. Limont, Jr., Manager

Mr. Alexander W. Limont, Jr. has been appointed manager of the Compressor Division of Sullivan Machinery Company, Michigan City, Indiana.

Mr. Limont has broad knowledge and experience in compressor problems. He is said to be responsible for the development and application of compressors for many special uses and has had exceptional opportunity for judging them from the users' point of view.

Mr. Limont was previously connected with the Norwalk Iron Works of Norwalk, Connecticut, as chief engineer and later with the Ingersoll Rand Company. He is a member of the A.S.M.E. committee which establishes the codes for Unfired Pressure and External Pressure Vessels.

Courses in Electroplating at Columbia University

For Men in New York City:

Dr. C. B. F. Young will offer two courses in electroplating and electrochemistry research at Columbia University during the Spring session. Registration will begin January 31, and continue to February 5, 1938. The first meeting will be held February 2, 1938. Further information may be obtained by calling Dr. Young at Flushing 9-0633.

Chemical Engineering e84 "Practical Electroplating." This course is designed to give the practical electroplater a study of ways and means of obtaining better deposits by applying the latest scientific methods of electrochemistry to electroplating. One hour of each evening is devoted to a lecture by the instructor and the remaining two hours are devoted to the application of these

principles by the student in the laboratory.

In order to take care of students who desire further training ,Chemical Engineering e86, "Investigation of Special Problems in Electrochemistry" has been established. The course is designed to give the practical electroplater or electrochemist a chance to investigate certain problems which are related to his field of work. One-half hour of each evening is devoted to a conference with the instructor, and the remaining two and one-half hours are spent in the laboratory where the student applies his knowledge and technique to the solving of problems which arise in such an investigation.

For Men Outside New York City:

The electroplating course may be taken by correspondence for those desiring education in electroplating living outside the New York area. The complete course consists of two divisions, the first giving the student a foundation in chemistry so that he will be able to comprehend the second course, which is practical electroplating. All laboratory equipment, books, notebooks, and so on, are furnished with the course.

General Abrasive Company Appoints Udylite Company as Distributors

General Abrasive Company, Inc., 3505 Hyde Park Blvd., Niagara Falls, N. Y., has recently announced the appointment of The Udylite Company, Detroit, Mich., as exclusive distributors for Lionite Polishing Grains in Detroit and vicinity. Complete stocks of all sizes will be carried in their warehouse at Detroit, Michigan.

Edward Joy Company Distributor of N. Y. B. & P. Products

The New York Belting & Packing Company, 1 Market St., Passaic, N. J., has announced that the Edward Joy Company, 133 Market St., Syracuse, N. Y., has been appointed distributor of the complete line of N.Y.B.&P. Mechanical Goods in the Syracuse territory.

The N. Y. B. & P. Mechanical Rubber Goods are sold only through distributors. Users of these high grade products in the Syracuse district are assured complete stocks through the facilities of this progressive distributor.

NEW 1938

Paasche TYPE BU Airbrush!

- **Even greater coating speed!**
- **Width of spray up to 19 inches!**
- **Uniform pattern at lower and also higher airpressures!**
- **New multiplehead — two types and six sizes!**
- **Better engineered — Fewer Parts!**

Mail coupon for full details — no obligation whatsoever.

Paasche Airbrush Co.
1910 Diversey Parkway
Chicago, Illinois

☐ Send free bulletin.

☐ We want a demonstration—no obligation on our part.

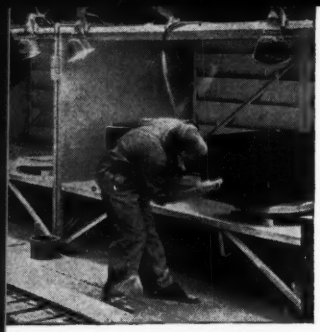
Guaranteed Savings FINISH WITH AIR Paasche

We airfinish.....

Name.....

Address.....

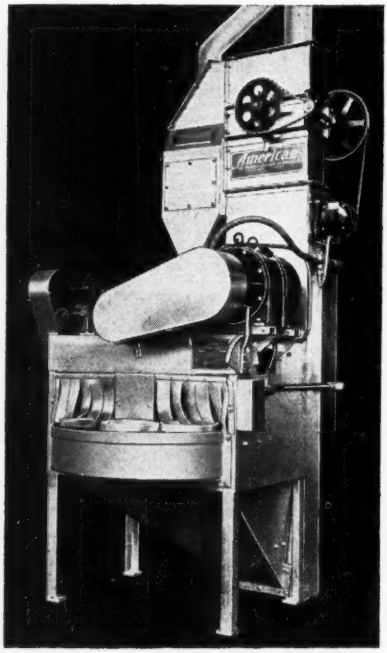
City.....



NEW
Plant Equipment & Materials

36x42-inch Wheelabrator Tum-Blast

A new model 36x42-In. Wheelabrator Tum-Blast has been announced by The American Foundry Equipment Company, 555 S. Byrkit St., Mishawaka, Ind. Many new features have been incorporated in the design of this centrifugal abrasive blast cleaning equipment. Fabricated steel side frames replace cast iron frames formerly used, making the unit much stronger. Welded corner and joint construction assures extra ruggedness and dust-free operation.



36x42-In. Wheelabrator Tum-Blast

Centrifugal force is utilized in whipping steel abrasive onto metal pieces being cleaned in the 36x42-in. Wheelabrator Tum-Blast, a gentle tumbling and complete exposure of all parts in the blasting zone being attained through the use of an endless conveyor apron

An improved suction-type abrasive separator is included at the elevator head as standard equipment on the new model. This separator effectively keeps the abrasive clean by removing dust and broken down abrasive after burned molding sand, forging scale and other foreign material are extracted by the rotary screen.

The 36x42-in. Wheelabrator Tum-Blast, with the standard conveyor, will clean metal parts weighing up to 30 lbs. Pieces weighing as much as 75 lbs. can also be cleaned, when the machine is equipped with a heavy-duty conveyor.

Complete information on this new model and other types of Wheelabrator equipment is contained in Catalog No. 211, which can be obtained from the manufacturer.

Juergens Magic Tack Rags

As an aid in producing a smooth finish on automobiles, furniture, and wherever enamel, varnish, lacquer or paint can be applied, the Wm. A. Juergens Co., 4036-40 Lagrange St., Toledo, Ohio, has placed on the market Magic Tack Rags. A Magic Tack Rag is a chemically treated piece of cheese cloth, made scientifically to retain a permanent "tack" that will never dry hard and that is spontaneous combustion proof.

The Magic Tack Rag is designed to pick up dust, lint, sand particles or any foreign accumulation on the surface which is to be finished. Magic Tack Rags are said to retain the "tack" indefinitely.

Thermolier Unit Heater

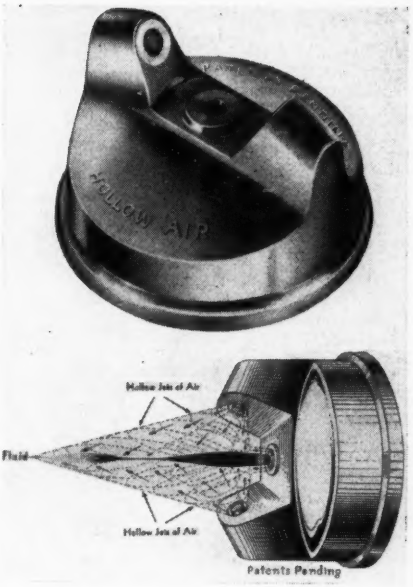
The Grinnell Company, Inc., 200 W. Exchange St., Providence, R. I., has placed on the market a Thermolier De Luxe Type Unit Heater which is said to have been created by leading industrial designers for unit heater installations where appearance is the major factor.

The Thermolier De Luxe Type of heater is said to embody the time-tested heating unit of the Thermolier industrial and factory types, in a modern housing finished in crinkle black and satin chrome. Heat distribution has also been improved by new angular louvres which provide widespread heat flow. Inlet and outlet pipes have been relocated at the rear and the specially-designed motor and fan are concealed.

The unit possesses the same fourteen engineered features of previous Thermoliers including the internal cooling leg, which continually drains condensate and keeps the entire heating surface effective at all times. The Thermolier De Luxe Type is recommended for installation in shops and similar places where an efficient source of heat is required.

Milburn Hollow-Air Atomizer Head

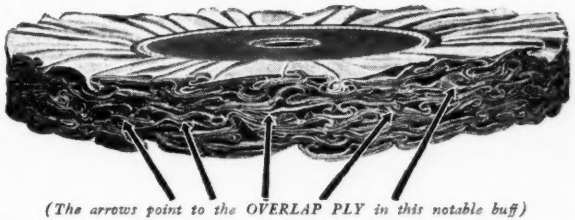
A "Hollow-Air" Atomizer Head or Air Cap for paint spraying guns has been placed on the market by The Alexander Milburn Company, 1436 W. Baltimore St., Baltimore, Maryland. This type of Atomizer Head is for use with the Milburn Type MM and Multi-Width Spray Guns. The development of the "Hollow-Air" impinging jets instead of solid jets of air heretofore used in paint spray guns is said to be entirely revolutionary.



Milburn Hollow-Air Atomizer Head

The jets of "Hollow-Air" are said to smoothly atomize synthetic enamels, paints, lacquers, and so on. Spray widths, with the usual air pressure and using either siphon or force feed, have attained almost phenomenal fineness

THE BIAS BUFF -the OVERLAP PLY TYPE



(The arrows point to the OVERLAP PLY in this notable buff)

Five sections of this buff equal same width of face as ten sections of an ordinary buff. We'll prove it!

BIAS BUFF & WHEEL COMPANY
430 Communipaw Ave. Jersey City, N. J.

— fast worker, thorough. Economical, saves compound. Easy for operator.

Secret is in the *overlap ply* — doubles the cutting face of buff, and retains the compound longest.

Give this buff a trial on cutting down heavy parts!

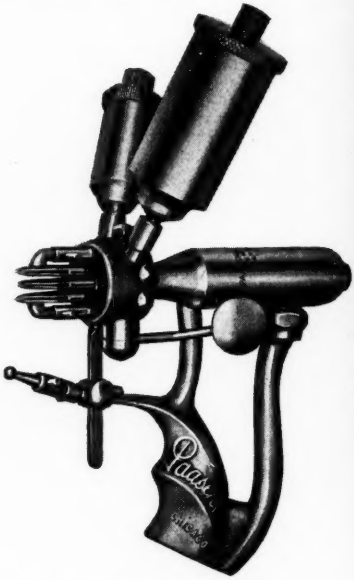
and width, atomizing to the outermost edges of the spray.

The "Hollow-Air" Atomizer Head is particularly desirable in the spraying of synthetic enamels which are difficult to atomize and must be applied with a uniform width and smoothness so as to avoid sagging and orange peel. The high gloss of synthetic enamels generally accentuates any surface or undercoat defect, consequently, the "Hollow-Air" Atomizer Head which will finely and equally apply this type of material to prevent these defects is said to be essential for satisfactory spraying operations.

The operation of a spray gun with a "Hollow-Air'" Atomizer Head enables the operator to apply synthetic paints with a fan spray of uniform width, without splitting. Satisfactory spray widths of 18 in. or more are obtainable with the "Hollow-Air" Atomizer Head.

Paasche Type 3LS Multicolor Striper

The illustration herewith shows a Paasche Type 3LS Multicolor Striper which has been placed on the market by Paasche Airbrush Co., 1910 Diversey Parkway, Chicago, Ill. The Multicolor Striper applies two colors—two or three lines—in one striping operating. It is made for applying two, three, or four



Paasche Type 3LS Multicolor Striper

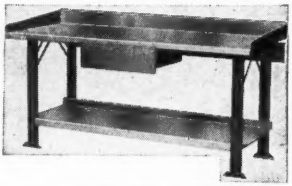
colors at one time and is adaptable for any surface.

The Type 3LS Three-Line Multicolor Striper stripes smooth or uneven surfaces. Accurate control of the striping material is insured by the handy pistol grip and the Easy-Thumb Operating Lever. The color adjusting screws control flow of color to each striping nib.

The two outside striping nibs slide back and forth to fit the contour of the surface being striped. This original striper is said to operate easily on horizontal or vertical surfaces. Its revolving, adjustable guide is suitable for any position or any surface. Special striping nibs can be designed to fit any special requirements. The Type 3LS Three-Line Multicolor Striper is available complete with revolving adjustable guide, one and two ounce color cups, including hanger and directions.

Barnstead Solvent Recovery Still

Substantial savings in solvent costs are said to be effected by the use of



No. 48-30 STEEL BENCH

Suitable for any kind of shop work. Heavy, rugged and rigid. Can be used singly or joined together for continuous benches. 12 gauge steel top and shelf. Sizes: 4 feet, 5 feet and 6 feet wide, right to left; 24 inches and 30 inches deep, front to back. Drawer: 20 inches wide by 18 inches deep by 5 inches high, with sliding tray.

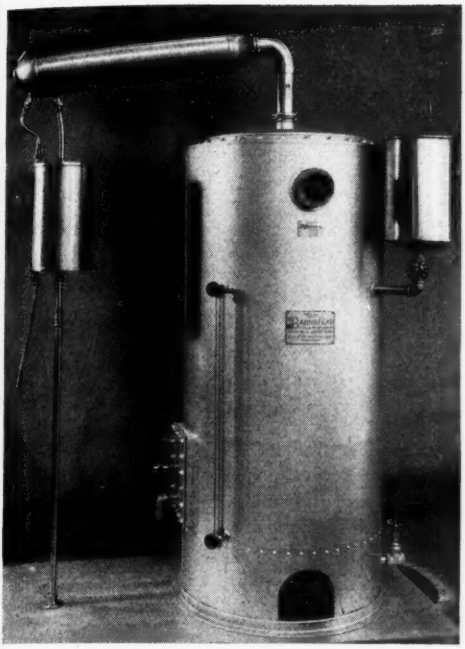
A COMPLETE LINE OF STEEL FACTORY AND SHOP EQUIPMENT

Write for catalog.

ANGLE STEEL STOOL CO.

704 OAK ST.

PLAINWELL, MICHIGAN



Barnstead Solvent Recovery Still

the Barnstead Recovery Stills which have been placed on the market by Barnstead Still & Sterilizer Company, 162 Lanesville Terrace, Forest Hills, Mass. It is said that this type of still returns practically any solvent that is old and dirty back to its original purity for only one or two cents a gallon, even when as little as 15 gallons of solvent per month are used.

Among the many solvents being recovered by the Barnstead Recovery Still are carbon tetrachloride, trichlorethylene, ethyl acetate, ether, alcohol, pentachlorethylene, acetone, toluol, benzol, and naphthas.

The Barnstead Solvent Stills are available for either continuous or batch operation in a full range of capacities. They may be heated by steam, gas or electricity as desired. Inasmuch as practically every problem in solvent recovery is different, these stills are made to order of the materials best suited to the particular requirements of the plant.

Rustex

A concentrated rust-proofing chemical fluid, to be known as "Rustex", has been placed on the market by The Rustex Company, 112 S. Maple Ave., Oak Park, Illinois. On iron and steel, its action is said to destroy and remove rust and tests have proven that the solution is perfectly balanced and highly dependable.

Rustex does not leave a coating over the steel, but changes its surface so that surface currents that induce rust are stopped. By changing the surface instead of coating it, the Rustex process is said to form a protection that is as flexible and ductile as the steel itself. Very accurately machined parts, such as fine screws, can be treated without impairing the accuracy of fit.

Rustex is said to provide a natural affinity for lacquers, paints, or enamels, through the pre-treatment of the smooth surfaces. There is a definite chemical action that takes place which changes the surface so that surface currents that induce rust are stopped. Under the microscope, the minute particles become visible when dry.

. . . for coating any flat surfaced material, whether in form of a heavy stiff board or a light flexible sheet for high grade work

The New Francis Model T-R

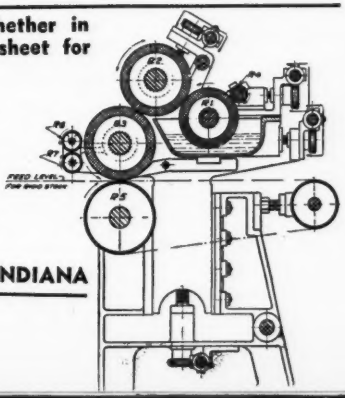
COATING MACHINE

This machine is fitted with Metal, Rubber, Composition, or whatever kind of Rolls are required, and provision is made for quick change from one kind of Roll to another. It will spread, uniformly—varnish, paint, adhesive, etc., on metal, wood, paper, leather, cloth, and other materials.

Largest and Most Complete Line of Coaters, Spreaders, Mixers, Presses, etc.

SEND SAMPLES OF YOUR WORK

CHAS. E. FRANCIS CO. RUSHVILLE, INDIANA



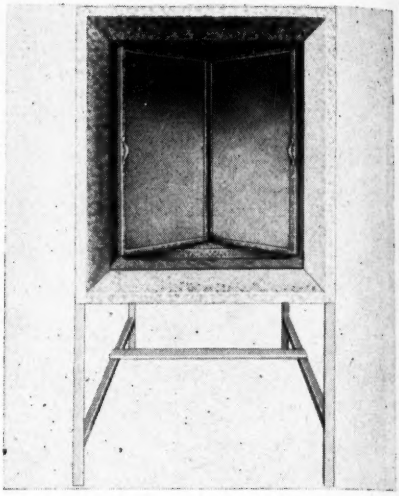
See other models described in this issue.

According to the manufacturer, Rustex removes corrosion and verdigris from brass, copper and bronze. It also disposes of the oxide film found on chromium plating, sterling silver, stainless steel, polished white metal, benedict and nickel silver. Rustex removes these films without injury to the smooth surfaces of the metal, avoiding scratching and bleeding. Zinc and aluminum require special treatments.

DeVilbiss Type XF Spray Booth

Announcement has been made by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio, of an improved spray booth, to be known as the "Type XF", for use with flock, now included in the line of standard DeVilbiss exhaust equipment. These booths have been designed especially to meet the peculiar requirements encountered in the application of flock.

Ranging in size from three to ten feet frontal width, the booths are of the direct exhaust type. They permit the concentration of flock-spraying operations in one location, reclaiming sprayed material not applied to the articles coated, and preventing this light material from scattering throughout the finishing room.



DeVilbiss Type XF Spray Booth

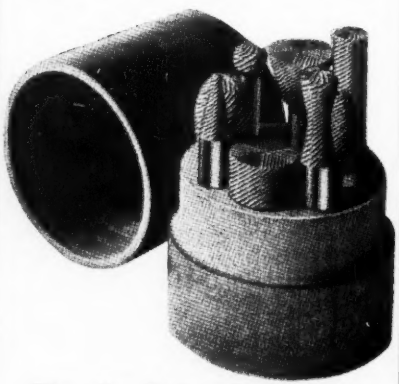
The booths are equipped with a metal curtain on top and sides. An opening in the floor, directly in front of the screen and extending the entire width of the booth, allows for the collection of overspray in the recessed chamber beneath. All booths are provided with the required number of sprinkler openings.

A hinged door at each end provides access to inside of collection chamber, and allows easy removal of accumulated material. Removable, reinforced cheese cloth screens at rear of booths collect the flock, and prevent it from passing out the exhaust pipe.

All booths are equipped with standard DeVilbiss exhaust fans. Motors recommended for these fans have additional power to provide for efficient exhaust when the screen becomes loaded with flock.

Three, four, five and six foot booths are leg type. They are of strongly welded unit construction, similar to standard DeVilbiss paint spray booths. Eight and ten foot booths are floor type, and may be obtained with metal floor if floor of finishing room is such that this is desirable.

ROTARY FILES



They Cut Faster—Last Longer

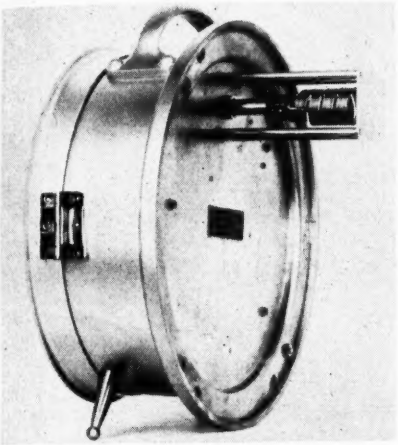
Ford Hand Cut Rotary Files are made of high Speed Steel. Write for information and prices.

M. A. FORD MFG. CO.

417 Pershing Ave. Davenport, Iowa

Bristol Portable Traveling Oven Temperature Recorder

A Portable Recording Thermometer for use in traveling baking ovens, fiinshing ovens, enameling ovens, and so on, has



Bristol Portable Traveling Oven Temperature Recorder

been developed by The Bristol Company, Waterbury, Conn.

The instrument passes through the oven on the conveyor with the "work" and gives a continuous record of the temperatures to which the heated product is subjected as it passes through the oven. The thermometer is especially useful in large enameling ovens in plants where electric and gas heaters and ice refrigerators are manufactured. It is also extensively used in ovens for treating the finish on automobile bodies. In this type of work it is valuable in maintaining the proper temperature for the color of the finish desired.

The Bristol Portable Recording Thermometer is light in weight, compact, and self-contained. The temperatures are recorded on an 8-inch round chart for 24-hour or 7-day clock rotation.

Sapolin No. 124 Hot Pipe Aluminum

Heated metal surfaces can be beautified by means of Sapolin No. 124 Hot-Pipe Aluminum, which has been placed on the market by Sapolin Co., Inc., 229 East 42nd St., New York, N. Y. This aluminum paint is scientifically manufactured for metal surfaces which are subjected to intense heat, fire or flame. It is said to give a bright silvery finish which actually bakes into the surface and becomes a part of the metal itself when subjected to heat. It is said to be a close approach to aluminum plating.

By the use of Sapolin No. 124 Hot Pipe Aluminum, it is possible to give a sparkling new finish to old, rusted surfaces as well as to prevent rust and disintegration on new ones. By withstanding a heat upwards of 1000 deg. F., it gives a heat-proof coating which can be applied by brush.

Sapolin Hot Pipe Aluminum is prepared ready to mix. The surface to which the paint is to be applied must be clean in order to obtain good adherence. The paint must be applied while the metal is cold. It will dry hard in a few hours.

Brown Pneumatic Transmission System for Remote Measurement with Air-Operated Control

Pneumatic Remote Transmission of

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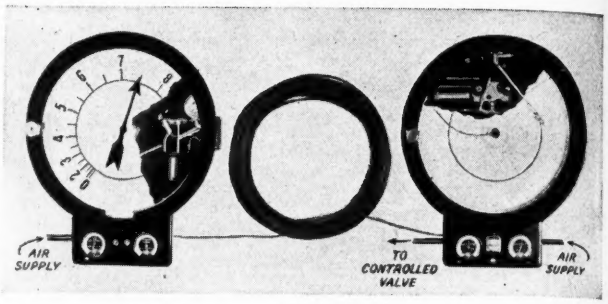
Measurement is the latest process control development pioneered by The Brown Instrument Company, Wayne and Roberts Ave., Philadelphia, Pa. It is entirely new —yet a safe and dependable system —designed primarily for remote measurement of process variables in atmospheres containing explosive gases — where electrical measurement is not permissible.



Brown Pneumatic Transmission System for Remote Measurement with Air-Operated Control

The Brown Pneumatic Remote Transmission System consists essentially of a Transmitting indicating instrument, at the point of operation and a Receiver which may be an indicator or recorder, located at the remote master control board.

The Remote Transmission unit is a simple, balanced air pilot, mechanically actuated, built into the indicating Transmitter. The Receiver is either an indicating or recording pressure gauge, calibrated in terms of the variables being measured.

Not only does Brown Pneumatic Transmission provide a safe and reliable means of transmitting measurement from the point of operation to a centralized control house, but it also provides an indicator at the point of measurement. This eliminates guesswork and encourages operators to attain best possible results—not just "good enough."

There is nothing delicate or complicated in the construction of the Brown Pneumatic Transmission System. There are only a few working parts and their simplicity of construction assures long, dependable service, free from mechanical difficulties.

Where accidental damage to the transmission line might occur, repairs can be made easily and quickly in the field —without special tools. Recalibration or compensation is never necessary when a transmission line is lengthened or shortened.

Results obtained from tests on Systems in actual daily industrial service for almost two years show these outstanding advantages:

1. Sensitivity—A definite pressure response for less than 1/10 per cent of full scale movement of the measuring element. Receiver records less than 1/5 of 1 per cent change.

2. Stability—Balanced pilot system of transmitter unit inherently stabilizes the mechanism so that it cannot overshoot.

3. Speed—One per cent change in metered value will be transmitted 200 ft. in less than one second; full scale change approximately 20 seconds.

4. Power—The element in the receiver develops a high pen torque for small

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changes in transmitted pressures.

5. Air Consumption—Only .016 cu. ft. of free air per minute.

6. Effect of External Vibration—Readings not affected by ordinary vibration at Transmitter or Receiver.

7. Effect of Ambient Temperature Changes—Ambient Temperature Change of 60 deg. affects readings less than ¼ of 1 per cent.

8. Effect of Freezing Temperatures—Operates dependably at sub-zero temperatures.

Francis Coating Machines

Chas. E. Francis Co., Rushville, Ind., has placed on the market a line of coating machines designated as the Models S-P. The weight of construction varies according to purpose and size. The frames of the machines shown in the illustrations herewith are of welded (fabricated) steel, however, these frames are also available in cast iron.

Accessibility for cleaning is a feature of the Francis S-P Coating Machines. All bearings are of the two screw split type so that any of the rollers can be lifted out by removing only four screws. The end seal plates are held in position by the motion of the rolls so that they can be removed simply by lifting out of place without the necessity of removing any fasteners.

The applying rolls are available cushioned with rubber, synthetic rubber, gelatin, rubber with a gelatin covering, or with a metal surface, to suit the individual requirements.

The feed roll and doctor roll are regularly made of steel tubing with heavy spider plates, electrically welded to both the shell and the shaft to form a rigid unit of high resistance to deflection, which when ground smooth, will retain its accuracy over a long period of service. The cores for the cushioned applying rolls are made in the same manner as the all steel rolls and then covered with the cushioning material.

The cushioned rolls of the Francis S-P Coating Machines are fitted with metal wear plates on their ends where they

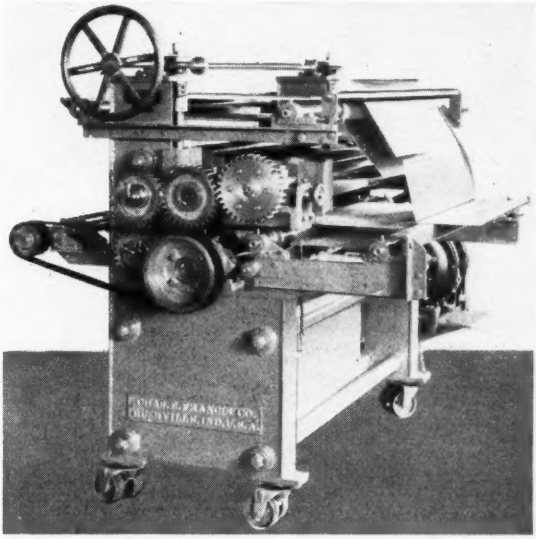

Fig. 1—Illustration showing a special Francis Model S-P Coating Machine equipped with automatic conveyor feed attachment.

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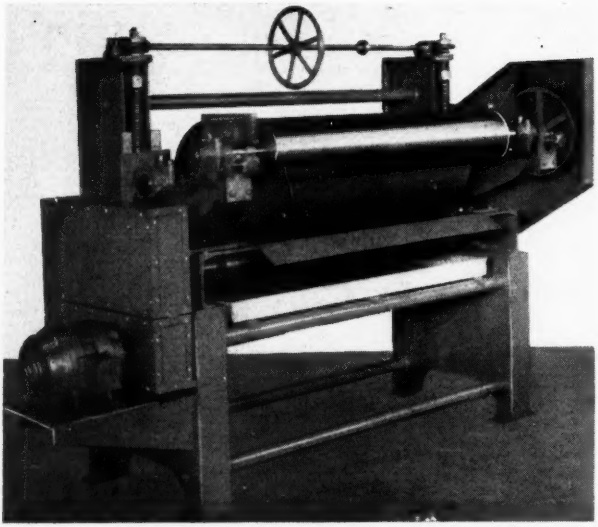

Fig. 2—Illustration showing Francis Model SPC Single Coater Machine. This unit is equipped with a 17-inch diameter rubber covered roll with adjustments which permit heavy coating with no treeing or snaking.

contact the seal plates. In this way, the cushion material does not contact any other member in any but rolling friction position, and roll wear and power consumption are held to a minimum.

The coating material is carried in a trough formed by the crotch between the doctor roll and applying roll, which is sealed at the ends by means of removable seal plates. This is said to eliminate the necessity for a separate pan or trough and greatly simplifies cleaning.

When made for single coating, the bottom roll acts as a feed roll only. This roll is then fitted with a doctor plate of spring bronze which removes any of the coating material that might be picked up from the applying roll in coating thin stock, so that no coating material will smudge on the dry side of the sheet or panel being coated.

The Francis Model S-P shown in illustration Fig. 1 is fitted with casters for portability. This machine is a 48-inch single coater and is equipped with a special conveyor. The weight of this machine is 3,500 pounds.

Cut gears are used in the Model S-P Machines and the kind of gears depends upon the job and purpose. Any type of drive can be used, such as ordinary motor, reused variable speed, and so on. The model shown in Fig. 1 is fitted with a circulating unit consisting of motorized pump, supply tank, and connections.

Westinghouse Air Coolers

Finned air coolers, designed to cool air or gases for turbo generators, synchronous condensers, water wheel generators and other apparatus, have been placed on the market by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Where surrounding air is moist or contains corrosive acids or dust,

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a cooler is said to be essential. Their use protects the windings and dielectric strength of the insulation.

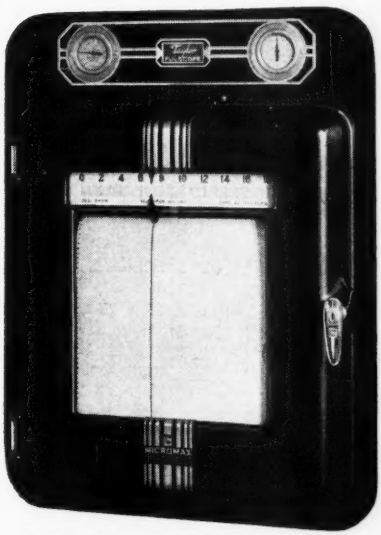
The body, or shell, of the air cooler consists of two structural steel plates, the edges of which are bent to form a rigid channel. These two plates are fastened together by cross members, which are welded to the sides of the cooler. The water boxes are fabricated from copper bearing steel. The cooling surface consists of Admirality metal tubes, upon which spirally wound copper fins are mounted. The tubes are rolled solidly into Muntz metal plates. The cooler is so designed that it is possible to remove any single tube from the tube bundle without disturbing adjacent tubes.

Taylor Fulscope Micromax Controller

For those process control problems where smooth, proportional valve action is imperative and the potentiometer principle of temperature measurement is preferred, Taylor Instrument Companies, Corner West Ave. and Ames St., Rochester, N. Y., now offer the "Fulscope Micromax Air-operated Potentiometer Controller." It is said to utilize the same completely adjustable, air-operated control mechanism that is used in the Fulscope temperature, pressure, rate of flow, and liquid level controllers.

The temperature measuring system is the Micromax recording and indicating potentiometer.

The Fulscope Control Unit operates in conjunction with the Taylor Motosteel Diaphragm Valve. Where precision valve action, or both precision valve action and compensation for changes in load may be necessary to prevent deviation from the control point, the Fulscope control mechanim can be supplemented



Taylor Fulscope Micromax Controller

with the Taylor Valv-Precisor or Dubl-Response Control Unit, respectively. Thus, control equipment which most economically solves the individual control problem may be selected.

Holland Buffing and Polishing Lathes

A line of buffing and polishing lathes has been added to the products of J. Holland & Sons, Brooklyn, N. Y. This line is a belt-driven type known as the Tex-rope or Multi-V-drive. This type of lathe is made in both heavy and light duty sizes, with a speed range of 1200 to 4000 r.p.m. The shafts are made of a high-grade carbon steel.

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Air-O-Chek Air Valve

An air valve, the design of which is a radical departure, both in principle and manner of operation, from the conventional type of hand-operated air pressure valve is found in the "Air-O-Chek" All-Purpose Air Valve now being marketed by Air-Way Pump & Equipment Co., 623 W. Jackson Blvd., Chicago, Ill.

Air-O-Chek All-Purpose Air Valve

The valve, illustrated herewith, is sturdy and simple, yet mechanically highly efficient. All operating parts are shielded within the valve and air hose. There are no protruding buttons or external control levers of any kind, and no packing glands. The ball and socket joint with actuating trigger stem is a mechanical feature said to be found only in the Air-O-Chek. All internal parts are free floating and may be removed for servicing simply by unscrewing the threaded nozzle head.

View Showing Operating Mechanism

The Air-O-Chek is made of solid bar stock throughout, brass and stainless steel, and is built to precision standards. The valve is always ready for use. It requires only a slight pressure of the thumb and hand at the head of the valve to flex the hose for instant release and control of air, in any volume and velocity. Positive shut-off is effected instantly by releasing the hand pressure or dropping the hose.

The Air-O-Chek Valve is available with Tip No. N1 in ¼, ⅜, and ½-in. sizes. Extension tips, also available, are ¼-in. flat, ¼x3 in., and ¼x10 inches.

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Neilco Metal-Cleen

Neilco Products Co., 5421 Cicotte Ave., Detroit, Mich., has placed on the market a product which is said to be an entirely new and different type of rust solvent, to be known as "Metal-Cleen". This product has been developed after a thorough study of the requirements in the many fields of its use and by persistent laboratory and research work plus determination to give the trade something new in the line of metal cleaners.

Metal-Cleen is composed of five series, each series representing a different acid combination. Each series has seven acid strengths and each acid strength has three solvent combinations. All of the Metal-Cleen metal cleaners can be reduced with water, two parts to one and many of them three to one.

Metal-Cleen is obtainable in single gallon containers, 5 and 12 gallon carboys and in 55 gallon returnable steel drums. Metal-Cleen is readily prepared and applied by anyone, since the instructions furnished are simple and easy to follow.

Each series is known by the letters, A, B, C, D, and E.

Series A and B are for use where no etching is wanted, but where corrosive and grease solvent action is important. The formulas under these two series are used in open vats, hot or cold, for dipping hot metal and for clean brass, bronze, copper, and so on.

Series C is for use where only slight etching action is desired yet for use where corrosive and grease solvent action is essential. The formulas in this series are for use in cold vats and for applying on the metal with brush or spray gun.

Series D is for use where a medium etching action is desired yet for use where strong solvent action on both rust and oil and where a slow drying solution is essential.

Series E is for use where extreme etching action together with quick solvent action on rust and oil is essential and where a slow drying solution is required.

The acid strength of each series is indicated by numbers, the lowest number of each series being the strongest acid.

Series A	Series B	Series C	Series D	Series E
103	113	123	133	143
104	114	124	134	144
105	115	125	135	145
106	116	126	136	146
107	117	127	137	147
108	118	128	138	148
109	119	129	139	149

The various solvent combinations of each acid strength are indicated by a letter after the number as, Series D No. 137 N. Each series is distinguishable from each other by its color.

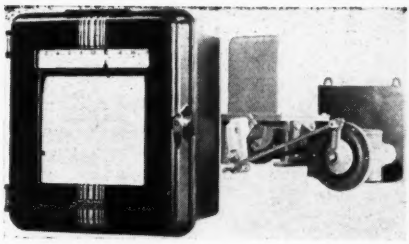
Galvide and Rust-Eeter No. 100

Two types of protective coatings, to be known as "Galvide" and "Rust-Eeter No. 100", are now being marketed by the Harrington Paint Co., Inc., 1630 Collamer Ave., East Cleveland, Ohio. Both of these coatings are said to provide protection against acid and alkali attack. Galvide is said to give perfect adhesion to galvanized iron without any acid etching or special processing before application.

Rust-Eeter No. 100 is a rust conversion primer and is said to give protection against oxidation. The manufacturer states that the surface to which this material is applied does not necessarily have to be entirely free from rust before application. Rust Eeter No. 100 is also said to provide protection against the attack of any inorganic acids or alkalies.

Leeds & Northrup Micromax Electric Control

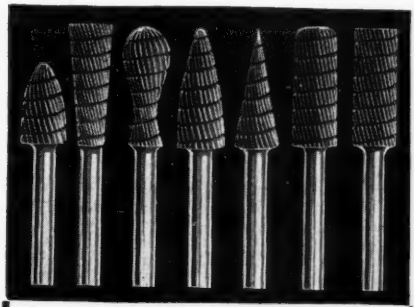
A recent development of the Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa., known as "Micromax Electric Control was on display at the Sixteenth Exposition of Chemical Industries held in Grand Central Palace, New York City, December 6 to 11. The Micromax Electric Control was shown as it can be applied to automatic control of corrective water treatment in municipal and industrial filter plants, and in industries using processed water. This equipment was of interest to the operator of industrial plants where process



Leeds & Northrup Micromax Electric Control

operations require a neutral water, filter plants using alkali to obtain good floc formation, and in lime softening filtration plants, on recarbonation systems, for prevention of corrosion, and whereve the pH of water effects efficiency of operation.

In addition to the Micromax Electric Control instrument, there were indicators, recorders and controllers for the measurement and control of conductivity and temperature. Laboratory instruments for the measurement of pH, conductivity and temperature were also exhibited, some with their respective



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primary elements. Other miscellaneous equipment included the general-purpose K2 potentiometer, the Type S (Wheatstone bridge) test set and galvanometer.

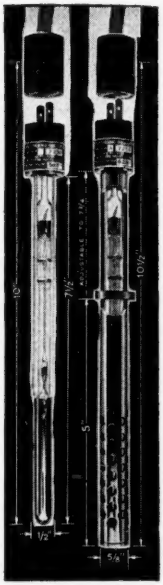
H-B Red Top Thermo-regulators

The Red Top Thermo-regulators illustrated herewith are especially designed to control temperatur s within one-tenth of one degree and are obtainable in either the armored or unarmored types. These instruments have been placed on the market by H-B Instrument Company, 2518 N. Broad St., Philadelphia, Pa. The range of application is adjustable from minus 30 to plus 500 deg. F.

The Red Top Thermo-regulators are actually adjustable thermostats. They are designed to permit the operator to set them at any holding temperature point within the above mentioned range. Resetting to different holding points may be done as frequently as desired.

These units are ideally designed for plating baths or other critical temperature applications, and are also adaptable for humidity control.

The method of setting the Red Top Thermo-Regulator is relatively simple. The mercury is contained within a sealed glass system, consisting of a bulb, column and reservoir. By tipping and transferring mercury between the bulb and the reservoir, the desired temperature level in the column is accurately obtained. A "setting factor", factory determined for each Thermo-regulator, is furnished together with detailed instructions for setting and operating.



H-B Red Top Thermo-regulators

Cooplac No. 825 Brushing Lacquer

A brushing lacquer which is transparent and which is said to produce a glossy film, to be known as "Cooplac No. 825", has been placed on the market by Charles Cooper & Co., 192 Worth St., New York, N. Y. Cooplac No. 825 can be applied with a brush in the same manner as a paint. Smoothness and appearance are inherent properties of this lacquer. It is recommended for metal articles of all types.

Benjamin Floor-Service Turnlox

A device which is said to permit easy removal of reflector, globe and lamp

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THE CHROMIUM PROCESS CO. Center St., Derby, Conn.

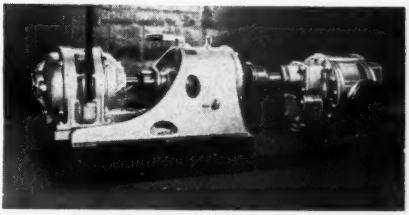
Benjamin Floor-Service Turnlox

from the socket in one, quick 90 degree twist, to be known as "Benjamin Floor-Service Turnlox", has been placed on the market by the Benjamin Electric Mfg. Co., Des Plaines, Illinois. Electrical and mechanical connections are made with the socket through a substantial three point, self-centering, bayonet lock. Automatic polarizing contacts are a feature of this design. Socket hoods which receive the detachable reflector units are available in ceiling mount and pendant types. The socket hoods are simply wired, fitted with porcelain terminal bases which fit any size or mogul base "Turnlox" reflector assembly.

A complete line of reflectors of heavy, seamless porcelain enameled steel is available with the Floor-Service construction feature. The "Reflector Changer", a light weight shaft and and engaging device, permits the operator to safely remove and replace the fixture at heights up to 18 feet.

Worthington Pump for Liquids of Varying Viscosity

A compact pumping unit for bulk transfer service where both thin and highly viscous liquids are handled has been developed by Worthington Pump and Machinery Corp., 421 Worthington Ave., Harrison, N. J. The pump is of the herringbone-gear-impeller type driven by a constant speed motor or internal combustion engine through a two-speed, enclosed transmission. For light liquids, the pump may be operated at high speed, while for viscous liquids the speed of the pump may be reduced. In either case, the full power of a prime mover is employed. In conventional applications of single pumping units on such service, motors are selected for the heaviest loads and are operated at a fraction of their rated power when pumping the thinner liquids. The two-



Worthington Pump for Liquids of Varying Viscosity

speed unit affords maximum efficiency because a relatively small constant-speed driver is used.

The manufacturer states that various applications of these units have proved satisfactory, due to the self-priming high-suction qualities and positive displacement features in the pump. There are no valves to retard the liquid flow, and the entire unit requires little space.

Modine Blast Heater

A blast heater for heating, ventilating, air conditioning and process application

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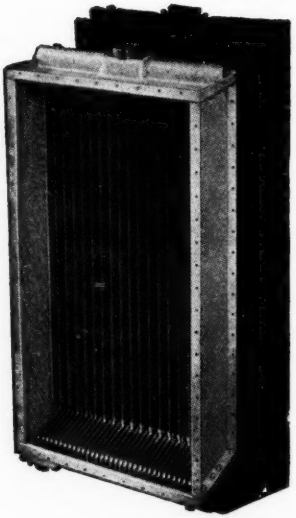
has been announced by Modine Manufacturing Company, Racine, Wis. Incorporated in this blast heater are several features of design which are said to materially increase structural strength and make for effective high heat transfer.

According to the manufacturer, one of the outstanding features of this heater is elimination of expansion strain. The expansion bend (patented) allows each tube to expand and contract as its temperature requires without affecting the tube adjacent to it, thus eliminating expansion strain and the possibility of leakage resulting from this strain. Headers and tubes are cylindrical and seamless for greatest possible structural strength. Tubes and headers are brazed into a single rugged unit without the use of gaskets, bolts or screw joints.

All steam-carrying passages of the Modine Blast Heater condenser, including headers, tubes, and inlet and outlet bosses, are of pure copper or copper alloy from the point where the steam enters to where it leaves in the form of condensate. It is claimed that all electrolysis probabilities are thus eliminated. Fins are metalically bonded to tubes to make a permanent junction impervious to years of operation under high temperatures. Increased heat transfer is promoted by scientifically die-forming fins to give effective turbulence to air.



Modine Blast Heater

To approximate final temperature and physical size requirements more closely, the Modine Blast Heater is available in a large variety of sizes and capacities—a total of 252 different heaters.

Binks L-367 Adapter for Paint Cans

A Standard Paint Can Adapter has been placed on the market by the Binks Manufacturing Co., 3114 Carroll Ave., Chicago, Ill. The adapter is said to make possible the use of the original paint can as a spray gun cup. The operator can change from color to color quickly the cup each time. The use of this adapter makes it possible to have a separate plainly marked can for all colors, primers, surfacers, and so on.

The L-367 Adapter is said to fit on all standard paint cans. In use, the adapter is placed on the top of a can, the handy lever clamps on the inside of the adapter are tightened and the new "cup" is ready to fit into the yoke of the spray gun attachment.

In the illustration, No. 1 indicates tightening clamps. The clamps are ar-

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In AKRON it's
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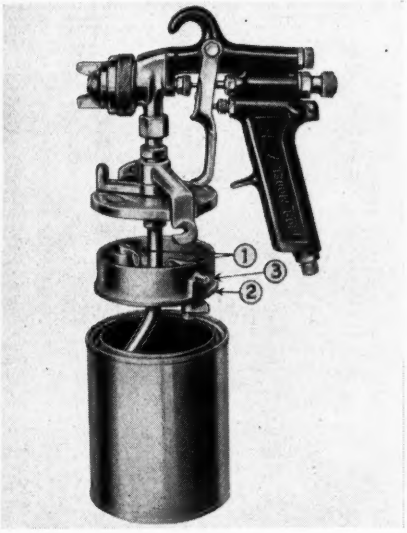
In TOLEDO it's
✓ The NEW SECOR
In JAMESTOWN, N. Y., it's
✓ The Jamestown and
✓ The SAMUELS

ranged so that they can be engaged partially and then tightened. To insure a seal-tight fit, a Thiokol gasket is provided. Ears are also provided on the adapter to fit into openings on the yoke of standard spray gun attachments.



Binks L-367 Adapter for Paint Cans

Frosto Air Line Freeze Preventative

An improved system of air line and air tool freeze preventative known as "Frosto" has been placed on the market by Sullivan Machinery Co., Michigan City, Indiana. Frosto has been developed particularly for industrial applications.

In operation, Frosto is vaporized and fed into the compressed air line near the compressor as fast as necessary to prevent freezing of water vapor in the compressed air lines and air tools. Only about a quart of Frosto is required to treat 100,000 cu. ft. of free air under high humidity conditions.

Sprayco Rinsing Nozzle

A new application of a rinsing nozzle, developed by the Spray Engineering Company, 151 Central St., Somerville, Mass., is said to eliminate the use of water baths for rinsing finished items in plating and finishing shops. According to the manufacturer of the Sprayco Rinsing Nozzle, the spray method gives a more thorough and rapid rinsing action than is possible with a rinsing bath and also results in considerable savings on water costs.

The nozzle produces a center jet spray and is furnished in sizes and capacities to accommodate water pressures available in individual plants. The Sprayco Rinsing Nozzle is easily installed in existing rinsing tanks and can be arranged for manual or automatic operation.

Opportunity Section

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